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The Annals

OF

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WITH WHICH IS INCORPORATED

"The Scottish Naturalist"

EDITED BY

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S. S. DAVIS, L.L.D.

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To Our Subscribers
Greeting.



Where do I make my nest?
on warm Mount Terror's crest
That's where in Spring we rest
In the Antarctic.

Where do my young ones feed?
'Mid the great tangle weed
Where squids are all we need
Through the Short Summer.

Then when the winter Snow
Dims the Volcano's glow
Northwards we always go
To the Canaries

And while youth was rife
Led I a roving life
Until I found a wife

Quite close to Rockall

Quite on the wrong track then,
Now, told the where and when
Please come and see my hen
On the black lava.

Wishing you a happy
New Year

W.S. Green

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[JANUARY

THE LATE PROFESSOR THOMAS KING.

THOMAS KING was born on the 14th April 1834, at Yardfoot, Lochwinnoch, Renfrewshire, a farm which was owned and occupied by his father. He received his early education in a small school in the village of Glenhead. He was destined to be a teacher, and in 1855, after the sale of his birthplace, and the removal of the family to Glasgow, he entered the Normal Training College of the Free Church of Scotland. The early bent of his mind revealed itself in his attendance on the class of Botany in that Institution. In 1862 he was appointed teacher of English in the Garnet Bank Academy, where, in addition to the ordinary subjects, he taught an advanced class of Botany. The work of the session, however, proved too much for his strength, which had never been robust, and he was obliged to relinquish the position. Through the influence of a brother, who had settled in Chili, he was appointed to an English school in Valparaiso. He took this step in the hope that a long sea voyage, and residence in a warmer climate, might be beneficial to his health. Leaving in July, he arrived at Valparaiso in October, 1864.

During eight years of residence in Valparaiso his health was in great measure restored, and his love of Botany found new fields for its devotion. His letters during this period to

a sister, with whom the latter years of his life were spent, and who survives him, are full of interest and reveal the enthusiasm of his nature. He describes the scenery of a valley near Valparaiso as resembling that of the Clyde valley about twenty miles north from Moffat, but narrower, and intersected by many cross valleys enriched with a profusion of wild-flowers, such as yellow calceolarias and mimulus, "growing like chickweed." The contrast between their richness and the sterile mountain scenery struck him as "very wonderful."

As evidence of the restoration of his health, we may refer to his ascent of La Campana de Quillota, a mountain of 6400 feet in height. The ascent was made by moonlight, which "steeped the great silent hills in light, and made one think how little of the grandeur and beauty of nature we see." At a height of 4000 feet the party rested for the night. When they reached the summit "the only sign of day was the morning star in the east," while "in the west the moon was shining on the sea." Gradually the light became "brighter and brighter over the mountains," "rays from the yet hidden sun" streaming into the sky, till at last "an intense point of the colour of lightning rose to view." When the full glory of the sunrise was upon them, the shadow of the mountain was projected for twenty-six miles over land and sea. There is frequent reference to the plants which he gathered; now a calceolaria "growing in a crack of a rock a few feet from the highest point," and again an "Umbellifer growing like great hassocks among the stones, like a moss about nine inches high, or the golden fern *Adiantum sulphureum*." The descent was made after sunrise, and at one point the party went into a copper mine, "but I, liking better what grows on the outside of the earth, took the opportunity to go among the plants." So characteristic of the man!

After eight years residence in Valparaiso he went to Santiago, and communicated to Dr. Philippi, Professor of Botany in the University there, the collection of plants and seeds which he had made during these years. It proved to be one of great value, including several plants new to science. *Schizostemma Kingi*, Ph., and *Tropaeolum Kingi*, Ph., perpetuate his name. He was the first to find *Stemmatum*

narcissoides, Ph. *Schizostemma* and *Stemmatum* formed new genera at the instance of Philippi. He was the first also to find *Errazurizia glandulifera*, Ph., a curious leguminous plant with "long rat-tail spikes of flowers of a peculiar purple and yellow" with an "incense-like" scent. Philippi named it in honour of President Errazuriz, and King adds—so characteristic again—"I was better pleased than if he had named it for myself."

Early in 1873 he returned to Scotland, with such restored health that he determined to remain at home. In 1873 and 1874 we find him studying Botany in the University of Glasgow, under the late Professor Dickson; and again in 1878-79 he attended the class of Practical Botany under Professor Bayley Balfour. For a time he was engaged in teaching in various schools in the West of Scotland, and set himself to qualify as a certificated teacher in Science. In 1877 he was appointed Lecturer on Botany in the Eastern Mechanics Institute, Glasgow; and in 1878 he was appointed to a similar position in the Glasgow Mechanics Institute, now incorporated in the Glasgow and West of Scotland Technical College. In 1883 he attended lectures on Botany and instruction in laboratory work at South Kensington, and in the same year he obtained the Certificate of the Department of Science and Art as a teacher of Botany. In 1889 he was elected Professor of Botany in Anderson's College Medical School, and in 1890 Professor of Botany in the Glasgow Veterinary College. He continued to discharge the duties of these various offices till the date of his death.

Professor King was an active member of the Geological, the Eastern Botanical, the Natural History, and the Microscopical Societies of Glasgow. He was a Fellow of the Cryptogamic Society of Scotland, of which he was Honorary Treasurer from the year 1883. He has left no permanent work in the literature of science, if we except an enlarged edition of Kennedy's "Clydesdale Flora," which he published, and an article on the "Botany of Scotland," which he wrote for the "Ordnance Survey Gazetteer of Scotland." But he frequently contributed valuable papers to the various societies of which he was a member.

It was while attending the Annual Conference of the Cryptogamic Society that he contracted the illness which proved fatal. On the evening of Monday the 7th September last he joined the members, who were assembled at Fochabers, in good health and spirits. The following day was one of long and arduous exertion in field-work, and at its close he was unusually fatigued. On the morning of Wednesday the 9th symptoms of pleurisy developed themselves, but they were not such as to cause any grave apprehension to the medical friends who were with us. Although he was not able to rise from bed during the remainder of the Conference, he was progressing favourably, and was interested in our work. When members left on Friday the 11th, it was in full hope that he would be able shortly to return to his home and duties. On Sunday the 13th, however, a relapse took place, with complications, and, though all that medical aid could do was done for him, he sank rapidly. It was a painful shock to all of us to learn that he died on Monday the 14th. It was matter of great satisfaction that his sister reached Fochabers in time to nurse him in his last hours. The end was peaceful. His remains were interred in the Abbey Churchyard of Paisley, beside those of his ancestors.

Professor King was a man of sterling character, which commanded the respect and esteem of all who came in contact with him. He had many friends, and no one can conceive the possibility of his having an enemy. Of a singularly guileless, unselfish, and gentle nature, he unconsciously attached to him all who had the privilege of his acquaintance. The very quaintness of his peculiarities made him more lovable. His enthusiasm in his favourite pursuits was unwearying, and latterly the study of fungi became the absorbing interest of his leisure hours. It was ever his highest delight to impart to others the knowledge which he possessed, and he was singularly patient in helping those who had the desire to learn. Devoted to science, he took little part in public affairs. Political or ecclesiastical controversies were alike alien to his modest and gentle nature. His presence will be long and sorely missed among us.

JOHN STEVENSON.

JAMES STIRTON.

A LIST OF THE BIRDS OF BERWICK-ON-TWEED,
WITH SPECIAL REFERENCE TO "THE BIRDS
OF BERWICKSHIRE," AND NOTICES OF THE
OCCURRENCE OF SOME OF THE RARER
SPECIES IN THE ADJOINING DISTRICTS.

By GEORGE BOLAM, F.Z.S., etc.

(Continued from Vol. V., 1896, p. 93.)

PASSERES.

MISSEL THRUSH, *Turdus viscivorus*, Linnæus.—A resident species, breeding in a few places within the limits of the borough, as, for example, in the plantation below New Water Haugh, and sometimes also in gardens in Ravensdowne. It is generally supposed to have increased very much in numbers, in the district, within what we may term (ornithologically speaking) historic times. Various recent writers have remarked upon its comparative rareness in their younger days, or when they first came to the district; but even so far back as 1830 or 1831, we find Selby writing: "This species within the last ten or fifteen years has become very common in the northern counties." While ten years later—viz. in 1840—he ranks the Missel Thrush as a resident "which in our younger days was considered a very rare bird," but "has now become common."

SONG THRUSH, *Turdus musicus*, Linnæus. } Well-known resi-
BLACKBIRD, *Turdus merula*, Linnæus. }

dents, breeding everywhere. In autumn the native stock is largely augmented by immigrants, perhaps from abroad, proof of which is very visible in the flocks of these birds which we sometimes meet with in the turnip-fields in October and November. At that season of the year numbers of them may also be found, upon our sea banks, where they forage for snails, etc., along the grassy ledges of the cliffs, and amongst the rank growth of herbage at their base.

To some extent, no doubt, the birds which breed with us are also migratory in winter, but possibly it is only the young birds which then move southwards. Be that as it may, it is quite certain that many of the old residents in our gardens do *not* depart, but remain throughout the year in their chosen haunts.

REDWING, *Turdus iliacus*, Linnæus. }
FIELDFARE, *Turdus pilaris*, Linnæus. } Common winter visitants,
generally associated in flocks. They arrive about October, and frequently remain till late in spring, sometimes until the middle of May.

RING OUZEL, *Turdus torquatus*, Linnæus.—Not unfrequently seen in Berwick, on migration, in autumn, and sometimes also in spring. The following dates, from my journals, may be of interest for comparison :—

1882. Oct. 14, and for a day or two afterwards.—Several noticed in the garden at Ravensdowne.
1883. Apl. 25.—One seen in garden, Ravensdowne.
1884. Apl. 27.—Two pairs near Scremerston, three miles south of Berwick.
- „ Sept. 14, and following days.—One or two in garden, Ravensdowne.
1885. May 4.—One in garden, Ravensdowne ; a Pied Flycatcher seen there same day.
1889. Oct. 20.—An old bird on sea banks at Scremerston, which my dog “winded” a considerable distance off. The “gamey” smell of this species, to dogs, is pronounced, and has frequently been remarked upon.
1891. Sept. 20.—Several about the plantation below New Water Haugh on this and succeeding days. Were rather unusually numerous in the neighbourhood this autumn.
1895. Jan. 7.—One seen by my brother amongst the trees at Scots Gate, in the town. This was a very stormy day of rain, wind, and snow, and the beginning of the severe frost which continued without interruption until March.

The occurrence of the Ring Ouzel in mid-winter is very unusual, though I had one from near Rock, in Northumberland, so late as the 1st November 1885 ; and saw another near Wooler, on 5th December 1883 (“Hist. Berw. Nat. Club,” vol. x. p. 388, and vol. xi. p. 258).

The individuals which visit us here in autumn are generally in immature plumage, with pale margins to all the feathers, imparting rather a light-coloured appearance to the birds ; gorgets on throats of a dull muddy grey and somewhat inconspicuous. The quill feathers of wings and tail in these immature specimens are sometimes obscurely barred or spotted, a peculiarity which I have also observed in some young examples of the Missel Thrush.

WHITE'S THRUSH, *Geocichla varia* (Pallas).—The only record for the district, of this rare accidental visitor to Great Britain, is the specimen killed at Hardacres, in Berwickshire, in December 1878. (Brotherston, “Hist. Berw. Nat. Club,” vol. viii. p. 518).

WHEATEAR, *Saxicola ænanthe*, Linnæus.—A common spring to autumn migrant, and usually one of the first to herald the return of spring. It often reaches us by the last week in March, my earliest record, for nineteen years, being the 23rd of that month, 1893. In autumn it congregates, in some numbers, about the vicinity of the pier, and sometimes lingers there until October.

WHINCHAT, *Pratincola rubetra* (Linnæus).—Another summer migrant, arriving in March, and I used sometimes to meet with the young, in our garden in Ravensdowne, on their return journey, in August, and September, at which season they are in a much spotted, and most interesting state of plumage. It is never numerous, but a pair or two sometimes nest within the limits of the borough.

STONECHAT, *Pratincola rubicola* (Linnæus).—Resident, and breeds in several places; always a pair or two upon the sea banks. The beds of coarse herbage at the mouth of the Whitadder, and on the Orit Island, on the Tweed, form favourite resorts during winter.

REDSTART, *Ruticilla phœnicurus* (Linnæus).—Not very numerous, but nests wherever suitable places occur, and is seen regularly in Berwick, in spring and autumn. I am not aware that it breeds nearer to the town than at Castle Hills.

BLACK REDSTART, *Ruticilla titys* (Scopoli).—This is a bird which one would think ought to be attracted by our rocky coast, but, though I have for years kept a careful look out for it, the only instance of its occurrence here is a female, in winter plumage, which was shot by my brother, on the rocks behind the pier, on 15th December 1893, and is now in my collection.

It has occurred once or twice on the Northumbrian coast, and has also been recorded from the shores of the Firth of Forth. It is not included by Mr. Muirhead in his "Birds of Berwickshire."

BLUETHROAT, *Ruticilla suecica* (Linnæus).—No record here, but in addition to the specimen recorded by Selby, from the Town Moor, Newcastle-on-Tyne, shot 28th May 1826, and now in the Newcastle Museum, one was taken at the lighthouse, on the May Island, on 22nd September 1881, (Gray in "Hist. Berw. Nat. Club," vol. x. p. 84), and another is recorded by Mr. Geo. Pow, of Dunbar (*loc. cit.* vol. xi. p. 248), as having been killed at Belhaven, in East Lothian, in the end of May or beginning of June 1868, and preserved by Mr. William Johnstone, Belhaven. The last mentioned specimen is said to have the central spot on the breast "yellowish brown with pure white below." The May Island bird was recorded by Mr. Gray as belonging to the entirely blue-breasted form, *R. wolff*, but I have been obligingly informed by Mr. Wm. Eagle Clarke that the specimen is now in the Museum of Science and Art, in Edinburgh, and belongs to the red-spotted race.

ROBIN, *Erithacus rubecula* (Linnæus).—As common, and as welcome, in Berwick as elsewhere. A considerable increase to the native stock is noticeable in September, and October, at which season I have often remarked it with the little bands of Redstarts, Warblers, Pied Flycatchers, etc., which sometimes pay a visit to the gardens in the town.

NIGHTINGALE, *Daulias lusciniæ* (Linnæus).—Although, as might be expected, this premier songster has not yet visited the borough, I have to put on record an undoubted instance of its occurrence in Northumberland, in June, 1893, not more than some twelve miles south of our limits, and within about half that distance, as the crow flies, of the Scottish Border.

It is no unusual thing for a Nightingale to be reported in the newspapers, as having been heard, in this, or that locality, in the northern counties, only upon investigation to turn out to be a Sedge Warbler, or some other night-singing bird, which has been treating the neighbourhood to an even-song, and has therefore been at once put down as a Nightingale; and it is perfectly marvellous upon what slight foundation these stories sometimes rest. Being accustomed to these paragraphs, I was in no way surprised to see it stated in the *local press*, in the early part of June 1893, that a Nightingale was to be heard singing nightly, in a wood near the village of Whittingham, and that another had been heard near Elsdon, both places being in Northumberland, and in the ordinary course of events, I should probably have paid but little attention to the matter. Of the reported occurrence at Elsdon, I heard nothing further, and cannot therefore say how far that story may have been correct; but happening to be a good deal in the Whittingham neighbourhood at the time, and hearing of the Nightingale upon all hands, I walked over to the wood, about midnight, on the evening of Sunday, the 11th June, and was no less astonished, than delighted to hear an undoubted Nightingale in full song. The bird sang from a low oak tree, near the eastern corner of the large wood, at Whittingham, and within a short distance of the village, and, late though the hour was, there was still quite a little knot of people gathered together to listen to the song. A footpath, from Whittingham to Callaly Castle, skirts the wood at this place, and afforded an excellent opportunity to every one to hear the bird without trespassing; but the Earl of Ravensworth, to whom Whittingham belongs, having heard of the Nightingale, had given orders to have it strictly protected, and consequently either the gamekeeper, or his son, remained on duty every night.

There could, of course, be no mistake about the song, but, in order to place the record entirely beyond suspicion, I made an appointment with the keeper, and revisited the place with his son, on the afternoon of the 13th, when I had the satisfaction of obtaining a very near view of the bird itself, close to the spot where I had heard it sing two days before. We remained near the wood for some time, and I had a second excellent view of the bird, and thought that I detected a pair of them, but of this could not be perfectly certain. Layton, the keeper, told me that he had first heard the song on the 14th of May, and that, almost nightly, a large number of

persons had come to hear it. As it afterwards turned out, the bird had almost ceased singing before I heard it, and it was very little either seen or heard after the 13th June.

It will be remembered that the summer of 1893 was one of the hottest, and finest, we have experienced for many years in the north of England, and it was supposed that the fine spring had tempted the Nightingale to exceed its usual northern limit. During May and June the barometer stood at a very high point, and remained practically stationary, whilst on the 18th June the thermometer recorded 85° in the shade in the Whittingham neighbourhood, and was up nearly five points higher a few days later.

It seems only right to notice here that in the "History of the Berwickshire Naturalists' Club," vol. viii. p. 446, the late Rev. J. F. Bigge has recorded that "during the very hot weather in the last week in June 1878 a Nightingale was heard, about eight o'clock, for several evenings, singing in a wood close to Blanchland, on the river Derwent, in the county of Northumberland. A great number of the inhabitants went out each night to hear it." But, unfortunately, Mr. Bigge does not state whether he himself had heard the bird, or whether he could personally vouch for the record.

HEDGE SPARROW, *Accentor modularis* (Linnæus).—Abundant at all seasons.

WHITETHROAT, *Sylvia cinerea*, Bechstein.—A common summer visitant, and breeds freely in the borough. In most years we used to have a nest of it, in Ravensdowne, and it was a frequent visitor with other warblers, in September.

LESSER WHITETHROAT, *Sylvia curruca* (Linnæus).—I have only once been able to identify this species here, when, as recorded in the "History of the Berwickshire Naturalists' Club," vol. x. p. 389, two examples were shot, one on the 14th, the other on 26th September 1881.

GARDEN WARBLER, *Sylvia hortensis*, Bechstein.—A not uncommon breeding species, both in Northumberland and Berwickshire, and well distributed, but within the borough itself there are few situations likely to tempt it and kindred species to settle. I first met with it, on migration, at Berwick, in 1883, when two or three individuals were observed in the garden, at Ravensdowne, on the 17th September and subsequent days. Since that date it has been noticed there on 22nd May 1884, a pair or more; 27th August 1884; 17th August 1885, and frequently between that date and 27th September following; and on 22nd August 1886. After this year, owing to our no longer occupying that garden, the same opportunities for observation have not been offered, but I still sometimes notice a bird or two in the vicinity. One seen so late as 25th October, in 1889, was busily engaged in stripping the berries off a

honeysuckle, growing in the Vicarage garden, at Ancroft, five miles south of Berwick.

In certain localities it greatly exceeds the Blackcap in numbers, as for example, in the Duke of Northumberland's park at Alnwick, where, upon more than one occasion, I have found more than half a dozen nests in the course of an afternoon. In reference to Mr. A. H. Evans's remarks ("Scottish Naturalist," 1891, p. 105), I may add that I have also found it nesting in Messrs. Stuart and Mein's nurseries at Kelso (first in 1883, and several times since), as well as in the neighbourhood of Yetholm, and in several other localities in that district.

Its partiality for garden fruit is well known, and, prior to 1877, I used to catch it under the raspberry nets at Weetwood Hall.

BLACKCAP, *Sylvia atricapilla* (Linnæus).—Another well-distributed breeding species in both the adjoining counties, and of pretty regular occurrence in Berwick, on migration, in April and September. It appears occasionally to winter in the district.

GREAT REED WARBLER, *Acrocephalus turdoides* (Meyer).—A passing reference may be made to the well-known instance of the occurrence of this very rare straggler to England, on 28th May 1847, near Newcastle-on-Tyne (J. Hancock, "Birds of Northumberland and Durham," and "Annals and Mag. Nat. Hist.," vol. xx. p. 135).

SEDGE WARBLER, *Acrocephalus phragmitis* (Bechstein).—An abundant summer visitant, breeding in any thickish hedge or undergrowth. It is an incessant singer, and carols away merrily throughout the short summer nights. Should it chance that the bird is silent, as we pass by his haunts, at this season of the year, all that is necessary is to "wake him up" by throwing a stone into the hedge, and, no matter what the hour may be, his ready tongue is at once let loose.

GRASSHOPPER WARBLER, *Locustella naevia* (Boddaert).—Breeds in both the adjoining counties, and may perhaps occasionally do so within the limits of the borough; but it is a most eccentric species, and crops up suddenly in some seasons, and begins to nest, where perhaps it has not been seen for more than a decade. 1879 was one of its years of plenty, and in June of that year, Mr. A. H. Evans and I found it nesting, quite numerously, amongst the heather, on the hillsides, between Yetholm and Wooler, in localities in which I have since looked for it *almost* in vain. In the same year, towards the end of June, it appeared in a hedge, by the roadside, near Castle Hills Lodge, and sang there nightly, for a week or ten days. This is the only occasion upon which I have seen this bird actually within "the Bounds," but in the following year, I found its nest, in Murton Dene, less than a couple of miles outside the parliamentary

limits of the borough, and have since taken it at Allerdean Mill, about four miles south of Berwick.

The Grasshopper Warbler is a shy bird, of very skulking habits, and, were it not for its peculiar song, might very easily be overlooked in a district. Its song is, however, so very different from that of any other bird, that it at once arrests the attention, and when once heard can never be mistaken for that of any other species. To the writer it seems almost incredible that any person, acquainted with the notes of both species, should ever confuse the monotonous *trill* of this bird with the *song* of the Sedge Warbler.

YELLOW-BROWED WARBLER, *Phylloscopus superciliosus* (J. F. Gmelin).—Hancock's well-known record from Hartley, Northumberland, on 26th September 1838, is still the only occurrence for the district.

CHIFF-CHAFF, *Phylloscopus rufus* (Bechstein).—Much less numerous than the next species, but a regular summer visitor, and vies with the Sand Martin as the first to put in an appearance in the spring.

WILLOW WARBLER, *Phylloscopus trochilus* (Linnæus).—The most abundant of our Warblers, breeding wherever there are a few trees to afford it shelter. The young in autumn are considerably yellower in plumage than adults, and at this season are often numerous in gardens in the town.

WOOD WARBLER, *Phylloscopus sibilatrix* (Bechstein).—There are no suitable nesting-stations for the Wood Wren in the borough, but it breeds sparingly over the surrounding district, both in Northumberland and Berwickshire. I once heard it in song, in the spring, in the plantation on the banks of the Tweed, below New Water Haugh, and have detected it, once or twice, among its congeners in the garden, in August and September.

GOLD-CRESTED WREN, *Regulus cristatus*, K. L. Koch.—Quite common in the surrounding districts, where it nests in most of the fir plantations; but it is only on migration, in the autumn, that it occurs in Berwick. At this season it is not unusual to meet with one or two of these mere atoms of bird life, in gardens, in the town, and I have sometimes also noticed it, amongst the coarse herbage, upon the sea banks.

LONG-TAILED TIT, *Acredula rosea* (Blyth).—Breeds in one or two localities, within a few miles of Berwick, and upon both sides of the Border, but to the borough itself it can only be regarded as a very occasional visitor, there being but little to attract it. I once met with a troop, foraging along the hedges of the "Boundary Road," near High Cocklaw.

It may be worth while to refer, in passing, to the specimen of the northern, white-headed form (*A. caudata*) recorded by Mr. Hancock, from Tynemouth, in November, 1852.

GREAT TIT, *Parus major*, Linnæus. } Both common residents,
 BLUE TIT, *Parus cæruleus*, Linnæus. }
 breeding alike in the town and in the adjacent country.

COAL TIT, *Parus ater*, Linnæus.—Breeds in suitable localities adjoining the borough, and possibly sometimes within it; but I do not remember having met with it very near the town itself.

MARSH TIT, *Parus palustris*, Linnæus.—Less common than the last species, but nests regularly, within a mile or two of our parliamentary boundary, on the English side. I have also found it breeding in Berwickshire, but do not recollect to have seen a specimen actually within our limits.

NUTHATCH, *Sitta cæsia*, Wolf.—I have never myself met with this bird on the Borders, but Gray ("Birds of the West of Scotland," p. 199) records a specimen, shot in the summer of 1865, near Hermiton, in Haddingtonshire, and another, killed in a garden near Dunse, in March 1856. Mr. Gray has also recorded ("Hist. Berw. Nat. Club," vol. viii. p. 157) having seen one, which had been shot near Jedburgh, on 18th January 1877; and in the same journal (vol. vii. p. 502) the late Mr. Brotherston, of Kelso, mentions having caught one on her nest, in a strip of plantation between Houndridge and Harpertoun, near Ednam, about 1850.

TREE-CREEPER, *Certhia familiaris*, Linnæus.—A resident, and found breeding, throughout the surrounding country, wherever woods prevail; but only a straggler on the outskirts of the borough.

The favourite nesting site of the Creeper is behind a piece of bark which has become partially detached from the bole of a tree, or in a crack caused by the splitting away of some large branch from the trunk. Such vertical fissures seem always to be preferred to a regular hole, such as a Titmouse would choose. It also builds not infrequently in old walls.

WREN, *Troglodytes parvulus*, K. L. Koch.—A common and well-known resident.

DIPPER, *Cinclus aquaticus*, Bechstein.—A familiar bird upon all our Border streams; breeds at "Cantie's Bridge," and at New Mills, on the Whitadder, within the borough. Two or three broods are reared in the season, the same nest being generally resorted to, with a new lining added to it; and a favourite station is occupied year after year. No matter at what distance the nearest trees may grow, the nest is always lined out with beech or alder leaves, and amongst these I have invariably found one or two leaves, seldom more, of the oak.

I have always kept a look out here for the northern form (*C. melanogaster*), but have never been able to detect it.

GOLDEN ORIOLE, *Oriolus galbula*, Linnæus.—In the "History of the Berwickshire Naturalists Club," vol. x. p. 387, I have recorded the capture of a mature male, near Middleton Hall, Belford, on 26th May 1881. The specimen is still in my collection. Middleton is about thirteen miles south of Berwick, and I am not aware of any other record for the district.

STARLING, *Sturnus vulgaris*, Linnæus.—A very abundant resident, and still on the increase. Less than a hundred years ago it seems to have been considered quite a rare bird, upon the Borders. Two broods are usually reared in the course of the season. Individuals, in a more or less white state of plumage, are not unfrequent in autumn; they seem invariably to be young birds.

ROSE-COLOURED PASTOR, *Pastor roseus* (Linnæus).—A casual visitant, which has only very rarely appeared in the district. The specimen recorded by me ("Hist. Berw. Nat. Club," vol. viii. p. 495) as from near Ancroft, in August 1877, I have since been informed by the person who shot it, was killed at Allerdean Folly, a place about five miles south of Berwick, and perhaps two miles from Ancroft. When shot it was sitting in a garden amongst some red-currant bushes, and was afterwards carried off to Ancroft by the policeman, who lived there, and who chanced to call at the "Folly" about the time; from him it was acquired for the Berwick Museum, but has since shared the fate of many another specimen in our local Institution, having long ago been devoured by moths!

There are several other records for Northumberland, one being by Selby, from Bamburgh, in July 1818, and another from West Ord, in the vicinity of Berwick, on 13th July 1832 (Dr. Johnston, "Hist. Berw. Nat. Club," vol. i. p. 4). In the same journal (vol. i. p. 253), Selby, in his "Report on the Ornithology of the District," read to the Club, in December 1840, refers to "Rose Pastor, killed at Tweedmouth and Ladythorn."

CHOUGH, *Pyrrhocorax graculus* (Linnæus).—Mr. Muirhead has shown that this fine species, which used formerly to breed upon the coast of Berwickshire, probably became extinct there between 1846 and 1855; but, although I have not been able to obtain any really satisfactory evidence upon the point, it seems just possible that it may be re-establishing itself in its ancient quarters. Thus, when the Berwickshire Naturalists Club visited St. Abb's Head, on 26th June 1895, a pair were reported, by some of the fishermen about Petticowick, to be nesting there. It was not until after we had returned to Coldingham that I heard of this, and no definite information could then be obtained about it, but on returning to the Head, a few days later, I was most positively assured, by more than one person, that a pair of Red-legged Crows had actually bred there that season, the nest being, it was said, in the cliff a little to the west of Petticowick

harbour. A high west wind, which was blowing at the time, made the day very unpropitious for a close examination of the rocks, and we were not fortunate enough to see a Chough, but one man, whom we met near the old camps, informed us that one had been running about upon the grass at the top of the cliff, within fifty yards of him, not ten minutes before our arrival!

Anything more definite than this I have been unable to obtain, either then or during several subsequent visits, and so, for the present, the question must remain an open one, but it seems scarcely right to omit all reference to it here; and, as we were informed by the fishermen that we were not the only persons who had been making similar inquiries of them, it is possible that some one may have been more fortunate in his quest after the Choughs than we were, and may, perhaps, be in a position to throw a little more light upon the matter.

A person named Penman, a signal-man upon the railway between Spittal and Scremerston, and who used to stuff birds a little, and take considerable interest in them, told me of one, which had been picked up by his wife, upon the sea-beach near his house, in September 1884, which was quite strange to him, but which, from his very graphic description of it, could really be nothing else than a Chough. The weather for some days previously had been very stormy, and the bird had been so much damaged, and knocked about, by the waves, that it was, unfortunately, not preserved; but neither the man, nor his wife, had any previous knowledge of the existence of such a bird as the Chough, and I am quite sure that there was no intention to mislead.

When the Berwickshire Naturalists Club visited The Glen, the seat of Mr. Edward Tennant, in Peeblesshire, in 1881, there was, amongst the collection of birds in the house, a specimen of the Chough, which Dr. Hardy elicited had been "shot by a ploughman somewhere in the vicinity" ("Hist. Berw. Nat. Club," vol. ix. p. 488).

JAY, *Garrulus glandarius* (Linnæus).—Still manages to maintain a footing in central Northumberland, where a few pairs breed occasionally. A friend, who is well acquainted with this species, in the county of Durham, informed me that he had seen one, during the protracted snowstorm of December and January 1890-91, at New Water Haugh, near Berwick. This is the only occurrence hereabouts within recent times.

MAGPIE, *Pica rustica* (Scopoli).—Fairly plentiful to the south of the borough, and nests regularly within a short distance of our boundary; much more uncommon on the north side of the Tweed. I saw one shot, near New Water Haugh, on 2nd October 1878.

The Magpie is one of the best checks we have upon the increase of the Wood Pigeon, being very attentive to the nests of those birds in the woods where it breeds.

(To be continued.)

ON THE INTERBREEDING OF THE RED GROUSE
(*LAGOPUS SCOTICUS*) AND THE BLACK
GROUSE (*LYRURUS TETRIX*).

By Rev. H. A. MACPHERSON, M.A.

THE Red and Black Grouse are both so plentiful upon the moors of the border counties of England and Scotland, that I have long expected to come across some additional instances of the well-known but rare union between *Lagopus scoticus* and *Lyrurus tetrrix*. It was therefore with great pleasure that I recently identified no fewer than four birds of this curious cross. My friend Mr. Michael Huthart rents the shooting of Shalloch, Kirkcudbrightshire,—a moor of less than 3000 acres, upon which both Red and Black Grouse nest in considerable numbers. The elevation of the moor never exceeds 1300 feet above sea-level, but the Black Game chiefly frequent the lower ground, which is full of rushy, broken land. Mr. Huthart was shooting over the moor with a party of friends upon the 26th of August 1896, when he came across a covey of birds—an old gray hen and seven or eight young ones. The gray hen got away unscathed, but Mr. Huthart shot two of the young birds right and left. On examination at the shop of Mr. R. Raine, the courteous taxidermist who preserved them, we found them to be male hybrids between the Red and Black Grouse. These birds, by an unfortunate oversight, were not weighed.

Mr. Huthart was shooting the same moor upon the 16th of September, when two birds got up, a few yards apart. The right bird, which fell to Mr. Huthart's gun, proved to be a young Blackcock; but the left bird, which was shot by a friend, was as certainly a female hybrid between the Red and Black Grouse. This bird was shot in the same neighbourhood as the two male hybrids first obtained. It was in good condition, and weighed a trifle over 1 lb. 11 oz.

A careful search was made for additional specimens of this cross, but only thoroughbred birds were killed until the 23rd of October, when Mr. Huthart's keeper noticed a suspicious bird, which he shot. This proved to be a beautiful female hybrid, and was killed at a distance of about half a

mile from the spot where the other hybrids had been found. It was quite alone. It was in the finest feather, and weighed 1 lb. 12½ oz. By Mr. Huthart's kind permission, I exhibited a male hybrid killed on 26th August, and a female shot upon the 16th of September, before a meeting of the British Ornithologists Club upon 20th November 1896. Their identification as hybrids between the Red and Black Grouse was accepted by all the members present. Mr. J. G. Millais stated that he had previously examined about eight hybrids of this cross, but had never previously seen a *female* of such origin. I begged that any doubts might be ventilated, but Mr. Millais vouched for the identification of these birds being absolutely correct and indisputable.

Having thus explained the circumstances under which the specimens in question were procured, it may not be out of place to add a few brief remarks upon the plumage of these birds. I ought to say here that Mr. Huthart generously presented me with a male and female hybrid for the Carlisle Museum. The other two birds remain in his own possession. Of the two male hybrids shot on the 26th of August, it may be remarked at once that they show plenty of the Red Grouse, both above and below. The tail in both of these birds is well forked. The bird belonging to the Carlisle Museum has the crown reddish brown, varied with broken bars of black; the nape is similar to the crown, but paler in ground colour. The neck is yellowish buff, broadly barred with black, but grouse-like feathers are *moulting in* to replace the first feathers. The feathers of the back are yellowish buff, barred closely with irregular black bars; but rich brown feathers, similar to those of the Red Grouse, are rapidly replacing the earlier feathers. The lesser wing-coverts are prettily varied with white. The secondaries closely resemble those of a young Black Grouse, and are quite unlike those of a Red Grouse. The feathers of the flanks are reddish buff, barred with black; but the greater portion of the breast is covered with dark, rich feathers, much like those of the Red Grouse. Each of these dark feathers has a white fringe, which is most extended in the feathers which occupy the centre of the breast. The under tail-coverts are black and white, but are only half grown. The second male bird much

resembles that just described, but is more pied with white. Many of the new grouse-like feathers of the back have white margins, while both the secondaries and the lesser wing-coverts are more conspicuously tipped with white. The breast of this bird, which Mr. Huthart retains, is so nearly of a glossy black, that a close examination is necessary to disclose the reddish bars upon the feathers. Moreover, the white margins of the feathers of the lower parts are broadly fringed with white, so that the centre of the breast appears to be entirely white.

As for the female birds, that shot on 16th September is much further advanced in plumage than the cock birds. The upper parts are a beautiful red, barred with black, the neck and upper breast recalling to an expert the broadly barred neck of a gray hen. The secondaries of both the female hybrids closely resemble those of a gray hen. The tail is slightly forked like the tail of a gray hen, and the central rectrices are edged with buffy white as in that species. The upper tail-coverts are likewise suggestive of the gray hen; but a more important character is supplied by the *under tail-coverts*. These are buffish white, broadly barred with black, and therefore very similar indeed to, if not actually identical with, the under tail-coverts of the gray hen. The wings of both this bird and the bird obtained in October are prettily *spotted with white*. The lower parts are also varied with white.

Many of the Red Grouse shot upon Shalloch are profusely pied with white. The male parent of these hybrids would appear to have been a heavily pied individual, at least if the amount of white exhibited by his hybrid offspring be any criterion. Let me observe, in conclusion, that these hybrids exhibit the comb of the Red Grouse, as long ago remarked by Macgillivray. They have longer legs than pure-bred Red Grouse, and stand proportionately higher. The toes are only feathered for a short distance from their base. Not the least curious fact connected with the occurrence of these birds is the abundance of both Black and Red Grouse upon the moor where they were apparently bred. Had Black Game been scarce, the pairing of the gray hen with a male Red Grouse would have been much less remarkable.

THE GREAT CRESTED GREBE AND OTHER BIRDS ON THE WHITE LOCH OF MYRTON, WIGTOWNSHIRE.

By Sir HERBERT MAXWELL, Bart.

I AM glad to be able to record the nesting of this fine Grebe (*Podiceps cristatus*) in Wigtownshire during the present season. As the circumstances of its arrival in the sanctuary at Monreith are somewhat remarkable, perhaps it may prove of some interest to your readers that I should put them on record. The White Loch of Myrton, a sheet of water of about 100 acres in the park at Monreith, has been treated as a sanctuary for wildfowl during more than fifty years, and since boyhood I have paid constant attention to the species frequenting it. In the spring of 1894, when on a visit to Lord Dartmouth at Patshull in Staffordshire, I was greatly interested in the numbers of Great Crested Grebes on the mere there, and I begged my host to endeavour to rear some young birds which I might introduce to my sanctuary. Owing, however, to the peculiar nidification of Grebes, it was found impossible to fulfil my wish. By a singular coincidence, on 7th November in the same year, I detected for the first time a solitary immature specimen of this bird on the White Loch. It remained till the great frost drove it away, but it returned in spring, and remained all the following summer and mild winter of 1895-96, still alone. However, during my absence in spring it must have secured a mate, for now there are three or four young ones disporting themselves with their parents. I shall be glad to learn of other instances of this Grebe nesting in Scotland.

Perhaps a note of the species of aquatic birds observed on this lake may be worth preserving.

HOOPER or WHISTLING SWAN, *Cygnus musicus*.—A flight of fifteen settled once and remained throughout the day.

WILD DUCK, *Anas boscas*.—Breeds in great numbers in surrounding woods.

SHOVELLER, *Spatula clypeata*.—First observed these in October 1894, a year when the American pond-weed was very luxuriant. Nine of them remained till the great frost, and several were about all last winter.

TEAL, *Querquedula crecca*.—A regular resident, breeding here.

WIGEON, *Mareca penelope*.—First noticed five of these in 1890. They abound on the adjacent coast and some of the neighbouring lakes, but avoided the White Loch till the American pond-weed took possession. In recent winters they have frequented it in hundreds.

SCAUP DUCK, *Fuligula marila*.—Occurs at irregular intervals.

POCHARD, *Fuligula ferina*.—A regular winter visitant; probably breeds here occasionally, as I have seen a few birds in most months of the year.

TUFTED DUCK, *Fuligula cristata*.—The same remark applies to this as to the Pochard. They are never wholly absent.

GOLDEN EYE, *Clangula glaucion*.—A few pairs frequent the lake each winter, but the majority remain about the sea coast.

GOOSANDER, *Mergus merganser*.—I watched nine one day in the spring of 1866, but have never since seen any.

GREAT CRESTED GREBE, *Podiceps cristatus*.—First appeared in 1894. Bred in 1896.

LITTLE GREBE or DABCHICK.—*Podiceps fluviatilis*.—A constant resident.

COMMON CORMORANT, *Phalacrocorax carbo*.—A frequent raider.

COMMON TERN, *Sterna fluviatilis*.—This bird and gulls of various kinds fly in from the sea, but owing to the absence of islets (the only island being thickly wooded) they are not fond of this lake.

WATER RAIL, *Rallus aquaticus*.—A regular visitant.

WATER HEN, *Gallinula chloropus*.—An abundant resident.

COMMON COOT, *Fulica atra*.—Exceedingly and provokingly abundant.

COMMON SNIPE, *Gallinago caelestis*.—Frequents the marshy margins.

JACK SNIPE, *Gallinago gallinula*.—A regular visitant.

COMMON SANDPIPER, *Totanus hypoleucus*.—Infrequent ; shores too woody.

HERON, *Ardea cinerea*.—Breeds in a wood near the lake.

COMMON BITTERN, *Botaurus stellaris*.—One was shot, I regret to say, in January 1893.

KINGFISHER, *Alcedo ispida*.—An irregular visitor.

No doubt, were shooting permitted, other birds might have been secured and identified, but the above have all been recognised, except the Bittern, without paying the penalty of death.

Since writing the above note I have witnessed a pretty scene. The mother Grebe and two young ones were in a shallow bay among a lot of Coots. I approached through the wood sufficiently near to have an excellent view of all their movements through the glass. The young birds were playing on the surface, diving, swimming with all submerged but their heads, and preening themselves. Meanwhile, the parent bird was busy fishing. From time to time she brought up a small perch four or five inches long, and held it in her bill till one or other of the young ones came and took it from her. Their movements were so quick that I could not detect whether she served them alternately or indiscriminately.

ON SOME NEW AND RARE BRITISH DIPTERA.

By PERCY HALL GRIMSHAW, F.E.S.

DURING the examination of a number of Diptera from various parts of Scotland, either sent to me for identification or presented to the Museum collections, I have come across many specimens of sufficient interest to record in these pages. Perhaps the most interesting point in connection with these new records, and one which seems to impress

itself more and more upon my mind, is the large proportion of Scandinavian species which are turning up in Scotland, revealing a remarkably close similarity in the insect fauna of these two countries. Before dealing with the various species *seriatim*, I must express my indebtedness to the gentlemen who have so kindly contributed to my knowledge of the distribution of Scottish Diptera, and whose names are mentioned under the various species.

SYRPHUS ANNULIPES, Ztt. (*new to Britain*).—Of this large and handsome species, a female was taken on ragwort in Kinfauns Woods, in July of last year, by Mr. W. Willie of Perth. It was forwarded to me for identification, along with a large number of other specimens, by Mr. Rodger, Curator of the Perth Museum, under whose care this interesting addition to the British fauna is now to be found.

As I quite expect such a conspicuous insect will be captured again and again in the neighbourhood of Perth, if not elsewhere, I venture to give a pretty detailed description of it, in order that it may be readily identified by any one coming across it.

S. annulipes, Zetterstedt, "Ins. Lapp.," 599, 3 (1838); "Dipt. Scand.," ii. 702, 4 (1843).—"Nigra, thorace nigro-æneo, nitido, scutello flavicante; abdomine fasciis tribus, prima interrupta, pedibusque, flavis, femorum basi, tibiarum posticarum annulo tarsisque omnibus et totis, antennisque, nigris; alarum stigmatibus nigris."

May be easily recognised by its large size, hairy eyes, nearly black, shining thorax, by the distinct flexure of the fourth (third of Schiner) longitudinal vein of the wings, and lastly, as indicated by the specific name, by the dark ring on the hind tibiae.

Eyes hairy, epistoma yellow, with black middle line and prominent knob, cheeks blackish, and, as well as epistoma, covered with pale yellowish hairs, front black, narrowly tomentose on each side in the male, more broadly so in the female, with the hairs entirely black, vertex shining black, especially in the female; antennæ black, or with the least tinge of reddish at base of third joint, arista reddish at the base. Thorax almost quite black, shining, with fulvous hairs on each side, scutellum brownish-yellow, sometimes slightly metallic, covered with black hairs. Abdomen shining black,

with three almost equally broad yellow bands, on the second, third, and fourth segments respectively; first band interrupted, second and third entire, with their anterior border straight and the posterior emarginate; fourth segment with the posterior margin yellow, which colour extends over on to the anterior margin of the fifth segment, round its sides and along its posterior margin; all the yellow bands extend to the lateral margins of the abdomen, and are continuous with those on the under side. These latter are similar in shape to those on the upper side, with the exception of that on the second segment, which is much broader and entire. Legs yellow, fore and middle femora black on their basal half, hind femora with the basal two-thirds black, fore and middle tibiæ yellow, hind tibiæ slightly bent, with a blackish ring near their middle, tarsi of all the legs black, with yellow metatarsi. Wings greyish, with a yellowish tinge at the base and along the fore border, stigma distinct, brownish, fourth longitudinal vein (third of Schiner) distinctly curved; halteres fuscous. Length of body 13-14 mm.; expanse of wings 27 mm.

CHRYSOCHLAMYS NIGRIFRONS, *Egger* (new to Britain).—

A male of this species was captured in May of the past year in Ferness Wood, on the right bank of the Findhorn (county of Nairn), by Mr. R. Thomson, who has most generously presented it to the Edinburgh Museum of Science and Art. It is very closely allied to *C. cuprea*, Scop., differing chiefly in the colour of the legs. In *C. cuprea* the legs are entirely yellow, or, at the most, blackish at the extreme base of the femora and the coxæ. In *C. nigrifrons*, however, the coxæ and the basal half of the femora are black, while in the male at least the middle portion of the fore and middle tibiæ is much darkened. On the head the frons of *C. cuprea* is yellow, but of *C. nigrifrons* quite black, with a bluish-white reflection. Finally, the antennæ, face, and scutellum of the latter species are much darker in tint, with the thorax of a bluish-black rather than a bronzy tinge.

DIDEA INTERMEDIA, *Lw.*—At the same time as the last-mentioned species, Mr. Thomson also sent for identification, and afterwards as a donation to the Edinburgh Museum, a specimen of *Didea*, which completely puzzled me, and led me to think it the type of a new species. After carefully examining it and considering the matter, I sent it on to Mr.

Verrall, our greatest authority on the subject, and he very kindly examined it, and reported as follows:—"I have been closely examining your *Didea*, and think it must be the same as a female belonging to Mr. R. C. Bradley and as a female caught by myself at Lairg. I consider these the same as the comparatively common New Forest species = *D. intermedia*."

This specimen was taken at Ferness, Dunphail, and so far as I know is the only specimen taken in Scotland besides the one mentioned by Mr. Verrall in the letter quoted above. The only other *British* record I can find is in a paper by the Rev. E. N. Bloomfield on "Rare British Diptera in the British Museum" ("Ent. Mo. Mag.," 1895, p. 113), where he mentions the New Forest as a locality.

CYNOMYIA ALPINA, *Ztt.*—In Verrall's "List of British Diptera" the name of this species is printed in italics, as requiring confirmation for its being a British insect. Among a small collection of flies from Barr, South Ayrshire, collected and sent to me by Mr. Anderson Fergusson, is an undoubted male of this species. In general appearance it has a wonderful resemblance to a common Bluebottle (*Calliphora*), but there are several important differences. As Zetterstedt points out, it is smaller, with a narrower body, the seta of the antennæ is not plumose to the tip, the alulets are white, not fuscous, while the apex of the abdomen is clubbed in the male and more acute in the female. The abdomen, moreover, is of a more greenish tinge and much more polished than in either *Calliphora erythrocephala* or *vomitatoria*, while the bristles on the apical segments are much stronger and more regularly disposed. In spite of these distinctions, however, the species have a remarkably close general resemblance, and no doubt this interesting species of *Cynomyia* has been often overlooked.

The only British record I can find is one in the "Scottish Naturalist," N.S., vol. i. p. 18 (1883-84), where Old Aberdeen is given as a locality by W. Armston Vice. Mr. Verrall has evidently considered the identification doubtful, and I am glad to be now able to confirm the occurrence of the species in Scotland.

It is perhaps a fitting opportunity to record a few other rare captures, though perhaps of less interest than the foregoing. These are the following :—

NEMOTELUS NOTATUS, *Ztt.*—Male, Luffness Links, near Aberlady, 10th July 1895 (Mr. Wm. Evans).

SYRPHUS LATIFASCIATUS, *Mcq.*—This very distinct and interesting species was taken by me at Slateford, near Edinburgh, on the 12th May 1896.

SYRPHUS BARBIFRONS, *Fln.*—Inverdrue, Strathspey, May 1895 (Mr. W. Eagle Clarke).

SYRPHUS GROSSULARIÆ, *Mg.*—Taken in large numbers in Dalmeny Park, near Edinburgh, 1st September 1896, by the Rev. Alfred Thornley.

ARCTOPHILA MUSSITANS, *Fab.*—Falkland, Fife, 14th August 1895 (Mr. Wm. Evans).

SPHEGINA CLUNIPES, *Fln.*—Gosford Park, Aberlady, 4th June 1896.

PSILOSONA LEFEBVREI, *Ztt.*—Male and female taken near Perth in August 1896 by Mr. W. Willie.

FLORULA OF A PIECE OF WASTE GROUND AT ABERDEEN.

By JAMES W. H. TRAIL, A.M., M.D., F.R.S.

(Continued from Vol. V., 1896, p. 245.)

Conium maculatum, L.—The distribution of the Common Hemlock in the north-east of Scotland is very suggestive of its being an immigrant through man's agency in this district, where it has become much more common within recent years. Only a few plants occurred on the enclosed ground in 1893; but year by year their number has increased, until in 1896 they formed a very conspicuous part of the vegetation.

Apium graveolens, L. (Celery), *Carum Petroselinum*, Benth. and Hook. (Parsley), and *Peucedanum sativum*, Benth. and Hook. (Parsnip), of which a few specimens were met with, doubtless owed their origin to the sweepings of shops.

Daucus Carota, L.—The cultivated form was not uncommon in the earlier years, but in 1896 it had almost disappeared, and the roots had become smaller and much more woody. In that year I found a single example of the wild form.

Caucalis nodosa, Scop.—This species is given in Hooker's "Student's Flora" as "from Banff southward"; but I am not aware that it had been previously detected in Aberdeenshire or Kincardine. Several plants occurred near together in 1893. Though some fruited it did not reappear. It had probably been the produce of refuse from among cereals, possibly from South Europe.

Scabiosa arvensis, L., had probably grown from mill refuse. It is extremely rare, if not a mere casual, near Aberdeen.

Erigeron canadense, L.—Of this native of North America, now widely naturalised in Europe, one or two were found in 1893 only.

Ambrosia artemisiæfolia, L., is another native of North America and immigrant into Western Europe. One plant was found, in good flower, in 1893.

Xanthium spinosum, L.—Of this strange-looking composite, a native of South Europe, a single large plant was met with in 1893. Though that summer was exceptionally warm, the plant failed even to develop mature flowers, and it perished during the following winter.

Bidens chrysanthemoides, Michx., a native of America, may have been introduced in the sweepings of some shop.

B. tripartita, L., though given in the "Student's Flora" as "in watery places from Elgin and Isla southwards," is not native in Aberdeenshire or Kincardine, so far as I am aware. The seeds were probably introduced with rubbish from cereals.

Galinsoga parviflora, Cav.—This very inconspicuous weed, a native of Western South America, has become so common in many localities in Europe, *e.g.* near London, that the source of the single example met with in 1893 is very doubtful.

Achillea crithmifolia, W. K.—Two examples of this plant of South-East Europe were found in 1893, probably grown from shop sweepings.

Anthemis Cotula, L., appeared very sparingly in 1893 and in 1896. As it occurs in cultivated fields from Fife southwards in Britain, and is widely distributed on the continent of Europe, it is useless to try to conjecture whence the seeds had been brought. None of these eight composites had, so far as I know, been detected in this district previously.

A. arvensis, L., is met with occasionally as a weed in fields near Aberdeen, but only as a rare casual. I have never observed it to reappear in fields in the same place in subsequent years; but on the ground in question it has held its own, or even become rather more abundant.

Chrysanthemum segetum, L., is not common in the immediate vicinity of Aberdeen, though plentiful a few miles inland. It was locally common near the mills, and a few plants grew scattered about the ground.

C. Parthenium, Pers., is a not uncommon casual or garden-escape near Aberdeen. It was locally abundant on this ground, the patches extending from year to year. It may have grown from impurities of cereals or from sweepings of shops.

C. coronarium, L.—Of this native of Southern Europe a single plant was found in 1893, no doubt grown from the rubbish of some seedsman's shop.

Matricaria Chamomilla, L., a common European weed, and known as a weed of cultivated ground in England, was fairly common in 1893, but diminished year by year in frequency; while *Tanacetum vulgare*, L., and *Artemisia Absinthium*, L., failed to reappear after 1893.

Artemisia arenaria, DC.—A single example, introduced probably in wheat from South Russia, was found in 1892. It had not been observed before in the district.

Calendula officinalis, L.—This common garden flower was not rare in 1893, doubtless introduced in refuse from shops; but it became less and less frequent, and was not seen in 1896.

Senecio viscosus, L., said in the "Student's Flora" to occur on dry ground from Banff southwards, is only a rare casual near Aberdeen, not reappearing in the same spot, so far as I have observed.

Arctium minus, Bernh., a local plant in this district, with a distribution suggestive of man's unconscious agency, was rare in 1893, but had in 1896 become almost a conspicuous feature in the vegetation.

Helianthus tuberosus, L., the Jerusalem Artichoke, has appeared sparingly year by year, probably from the outcast produce of some garden.

Centaurea Cyanus, L., a sporadic cornfield weed in Aberdeenshire, and *C. Calcitrapa*, L., a native of Southern England and of Middle and Southern Continental Europe, both appeared here and there, the latter plant only in 1893 and 1894. Both were probably introduced in refuse from cereals.

Cichorium Intybus, L.—The Chicory is a somewhat rare casual in North-East Scotland. A few examples have shown themselves, perhaps from the same stocks, year by year. Probably the seeds were introduced in rubbish from shops.

Picris echioides, L.—Of this species, noted as growing from Haddington southwards, a single large example grew up in 1893, but no seeds seemed to have ripened.

Leontodon hirtus, L., is one of our rarest plants in this district, if indeed it is more than a casual. I found one large plant on this ground in 1894; but, though it produced several heads of ripe fruits, the species has not been found here in 1895 and 1896.

Lithospermum arvense, L., is very doubtfully indigenous in this district; and *Echium vulgare*, L., does not grow wild within a good many miles of Aberdeen. The few examples of each on this ground were doubtless introduced with refuse from the mills.

Volnulus sepium, Junger.—A patch of this Bindweed has been growing at the narrow western end of the ground since 1893, and has continued to extend its area, while a few scattered plants have also been found in 1895 and 1896. It seems to have been introduced in garden refuse.

Solanum tuberosum, L.—Potatoes continue to grow scattered in small numbers (the produce of shop refuse), in almost the same numbers year by year.

Lycopersicum esculentum, L.—In 1893 several patches of the ground bore many small tomato plants, evidently the produce of decayed fruits cleared out of shops. That summer being exceptionally warm, many of the plants flowered, and a very few even produced ripe, though small, fruits; but the following winter appeared to have destroyed the species, which has not reappeared.

Nolana prostrata, L.—The two examples met with in 1894 must be regarded as having grown from shop refuse. The same source probably explains the existence of the very few examples of *Verbascum Thapsus*, L., *Mimulus luteus*, L., and *M. guttatus*, DC. The species of *Veronica* were surprisingly ill represented.

Mentha Piperita, L.—A patch observed in 1893, probably outcast from a garden, has extended from year to year. Of *M. viridis*, L., a patch was detected in 1896, but was covered with cinders last autumn, as were also some plants of *M. arvensis* observed in 1894 and 1895.

Scutellaria galericulata, L.—This is one of the most local of our native species, occurring in only one small spot on the Kincardineshire coast, some miles from Aberdeen. Its appearance on the reclaimed ground was very unexpected.

Stachys italica, Mill.—Of this South European plant a single example flowered and fruited in 1893, but no more were found.

Salsola Tragus, L.—The so-called “Russian Thistle” may have grown from seed introduced among wheat from South Russia, or from North America, where it is now a most troublesome weed in many places.

Polygonum equisetiforme, Sibth., another plant of Southern Europe, was not very rare locally in 1893, but did not recur. It also was probably introduced among cereals.

Cannabis sativa, L.—The refuse of shops probably accounted for the presence of several plants of Hemp in 1893; but, though some of these ripened seed, only a few plants appeared in 1894, and none afterwards.

Juncus tenuis, Willd.—The occurrence of a single specimen (in 1894) of this rush is suggestive of its introduction among refuse from abroad. It had not been observed in the East of Scotland before.

Phoenix dactylifera, L.—After the warm summer of 1893, several seedling Date Palms reached a height of eight or nine inches on different spots where the refuse of fruit shops had been laid. However, the following winter destroyed all.

Panicum miliaceum, L.—A few examples of this grass, native in the East, and now cultivated in South Europe, were found in 1893, probably introduced among cereals; and the same may be said of *P. Crus-galli*, L., and *Setaria viridis*, Beauv.

Phalaris canariensis, L., occurs frequently as a casual about Aberdeen, the result of its use as a food for birds. It has appeared each year on the reclaimed area in small quantity.

P. arundinacea, L.—Of the striped variety, or “Gardeners’ Garters,” a small patch was found, doubtless an outcast from a garden.

P. cærulescens, Desf.—This grass, native in Southern Europe, was not very rare on one or two limited spots in 1894 and 1895.

Alopecurus agrestis, L.—A very rare casual near Aberdeen, where it is probably introduced with grass seed for hay or lawns. A few plants grew on the reclaimed ground in 1896.

The various cereals, species and forms of *Avena*, *Triticum*, *Secale*, and *Hordeum*, were clearly the produce of seeds contained among refuse from the neighbouring mills or from shops and warehouses.

With them, as weeds, were probably introduced from Continental Europe such grasses as *Apera Spica-venti*, Beauv., *Avena strigosa*, Schreb., *A. fatua*, L., *Festuca uniglumis*, Sol., *Bromus madri-tensis*, L., *Ægilops triuncialis*, L., and *Æ. caudata*, L., all of which were found in 1893 or 1894, but either did not appear in a second season or became scarcer year by year.

Glyceria distans, L., and *Hordeum maritimum*, With., which were both locally common in 1893, were much less common in 1894, and were not found after that year. *G. distans* is not common in this part of Scotland. It had probably been introduced among refuse from grass seed. *H. maritimum* more likely owed its presence here to its occasional use as an ornamental grass.

Lolium perenne, L.—The Rye Grass was abundant in 1893, becoming relatively less abundant in 1894 and 1895, and a little more common again in 1896. In 1893, and even more markedly in 1894, it showed a very great diversity in its development, largely due to differences in the soil. On the beaten tracks and harder spots the plants were often very stunted, with slender inflorescences and distant small spikelets; but where the soil was rich in organic food many of the plants grew to a great size, and bore very large inflorescences, many of which bore numerous branches. The branched forms often showed a tendency to bear small abortive spikelets. Occasionally a stem bore an inflorescence of the usual form on a branch from a node near the base, and ended in a large branched inflorescence on the main stem.

A comparison of the lists for the several years will show the general course of change that the vegetation underwent from year to year; but a very brief summary will not be out of place here. A large number of the adventitious species that appeared in 1893 did not survive the following winter, or reappeared in 1894 only in much diminished numbers. Others, like the vine, have lingered on in lessening numbers till 1896; others, like celery, have just held their place; and others, such as *Sisymbrium pannonicum*, *Medicago sativa*, *M. falcata*, and *Melilotus officinalis*, have increased considerably. A few, e.g. *Melilotus alba*, became more common for a time, and then appeared to die out. It is curious to note that some of our most common weeds of cultivated soil never seemed to gain a hold, even when they formed a part of the vegetation in 1893. *Fumaria officinalis*,

Viola arvensis, *Lapsana communis*, *Myosotis arvensis*, and *Veronica agrestis* may be named as instances. The absence of such species as *Raphanus Raphanistrum*, *Veronica hederæ-folia*, and other very common weeds of cultivated ground was also noteworthy. In 1893 the number of species and varieties was greater (192), though the soil was bare, or nearly so, in many spots. Here and there the herbage grew more strongly, but no species showed a marked preponderance over the remainder; hence the vegetation was more varied. In 1894 the number of species had fallen to 122; and I noted, as compared with 1893, the great increase in grasses of coarse habit, and other plants of vigorous growth, such as thistles, docks, the larger melilots, etc. The additions to the list of plants observed in 1893 were *Sisymbrium pannonicum*, *Medicago sativa*, *Lithospermum arvense*, *Mentha arvensis*, *Phalaris cærulescens*, and *Festuca pratensis*, and six others less noteworthy. Thus 82 species had disappeared. A large portion of the ground was covered up at this period by the rails and cinders laid in summer. Proliferation was very frequent in *Trifolium hybridum*, and enlargement and branching of the inflorescences in *Lolium perenne*.

In 1895 the changes in the type of vegetation continued, large portions, where not covered with cinders, bearing a very coarse vegetation of grasses, thistles, and other rank herbage. A few plants observed in 1894 were not noticed in 1895, but a few others (bringing the total for the year to 120) were detected that had not been observed during 1894. Some of these were growing on the cinders, others as single examples here and there. In 1896 the area under cinders had been considerably widened, and several species not previously observed were found on them, as also a few already noted in 1893 but not observed in 1894 and 1895. The number was thus raised to 132. Woody species, both shrubs and trees, were beginning to be more noticeable on the cinders, as well as on the area not yet covered over, which still occupied a large portion of the eastern end and a narrow strip along the south side. On this uncovered area, with the exception of the thinly covered roads, the vegetation had become extremely coarse, and almost all the smaller or

more delicate plants had disappeared. Some of the grasses (*Phleum pratense*, *Agrostis palustris*, *Dactylis glomerata*, and *Agropyron repens*) covered large patches, often to the exclusion of almost every other plant. Over most of the area thistles (*C. lanceolatus*, and more locally *C. arvensis*) abounded, often in dense beds. Here and there grew conspicuous clumps of hemlock, burdock, goosefoot, docks of various species, and the larger nettle, and large masses of *Tussilago* covered the ground. *Sisymbrium pannonicum*, *Medicago sativa*, *M. falcata*, and *Melilotus officinalis* continued to increase in numbers. Here and there certain other species showed an increase, but for these reference must be made to the list. As previously noticed, the cinders showed in general a very poor vegetation, with, here and there, greener patches of deep-rooted species, or of others that require little soil. Some heaps of refuse soil and of manure lying on the cinders were covered with close vegetation, one being almost covered with *Polygonum Convolvulus* and some examples of *Saponaria Vaccaria*. During the autumn of 1896 a considerable additional tract has been covered with cinders, which will still further modify the vegetation noted during the past four summers. The products of the cinder beds will probably afford an interesting study of the types of vegetation that can find a suitable home on them in future years, if all vegetation is not excluded by railway extensions.

NOTE.—*Vicia tetrasperma*, Moench.—In the October issue, p. 245, I stated that this “had not been observed in this district before.” Since the publication of this statement I have been informed by Mr. A. Somerville that, during a visit to Aberdeen in 1881, he found this species “growing in the outskirts of the city,” and forwarded the specimen alive to Sir J. D. Hooker, at Kew.

Potentilla recta, L.—I have recently been shown a specimen of this species found within the inclosure of the Railway Station at Dyce, a few miles north of Aberdeen. It may have been introduced from the same source as those found by me at Aberdeen (p. 245).

JUNCUS TENUIS, WILLD., IN WESTERNESS.

By ARTHUR BENNETT, F.L.S.

THE remarkable way in which this plant is being found in so many places in Great Britain and Ireland is very puzzling as to the "reason why." Whence does it come if introduced? and how? In the "Journal of Botany" Mr. J. Lloyd Williams,¹ in an interesting account of the plant as found in Wales, suggests: "May not the seeds have been carried over with cargoes of corn" (*i.e.* from America). But does it grow among corn in America? and the threshing and winnowing would rather be disposed to get rid of such seeds. My own idea, as a suggestion, is—A few years ago hay was so dear that it was imported from America to a large extent, the price it fetched here then paying to do so. Now, *J. tenuis* could easily have been brought over in this, or even in packing materials. I have picked off the packing of Belgian and French glass a large number of plants (non-British), and with good seed among them.

Mr. Williams notices the varieties that Engelmann described from American specimens. However much these may hold good there, I have British specimens that practically combine the two on one root.

This note is written to record yet another Scottish county. My friend Mr. W. F. Miller sent me specimens to verify, gathered by Mr. W. Grant near Arisaig, in Inverness, where he finds it in several places growing in similar localities to *Juncus bufonius*, L.

Of course my suggestion will not meet the plant's occurrence in Renfrewshire, whence a specimen was sent in 1863 to the Greenock Museum, under the name of *J. acutiflorus*, by Mr. John Thomson, Dennistoun.²

It may be of interest to here recapitulate the various counties in which it has occurred, viz. :—

Hereford, Toundrow, "Journ. Bot.," 1884, p. 91.
Kirkcudbright, J. M'Andrew, *l.c.*, 1887, p. 374.

¹ Pp. 201-204, 1896.

² "Trans. Glasgow Nat. Hist. Soc.," 1889, p. 168.

- Kerry, N. W. Scully, *l.c.*, 1889, p. 335.
 Renfrewshire, P. Ewing, "Trans. Glasgow Nat. Hist. Soc.,"
 1889, p. 167.
 Carnarvon, W. H. Painter, "Journ. Bot.," 1891, p. 120.
 Dumbarton, L. Watt, August 1891.
 Cornwall E., J. N. Graham, "Journ. Bot.," 1894, p. 311.
 Cork, N. A. Phillips, "Irish Naturalist," 1894, p. 205.
 Stirling, N. Kidston, specimen, December 1894.
 Devon, N. Hiern, "Journ. Bot.," 1895, p. 282.
 Westernness, Mr. Grant, 1896.
 And the old record "Found by G. Don in 1795 or 1796 by
 the side of rivulet in marshy ground among the moun-
 tains of Angusshire, but very rarely" ("English Botany,"
 t. 2174, 1816).

The Arisaig specimen sent me is more slender in all its parts, and has fewer flowers than the majority of the British or Irish specimens.

That there is some agency at work in this distribution is shown by the same parcel containing from Arisaig specimens of *Euphorbia Cyparissias*, L., and a *Potentilla*, probably *P. norvegica*, L., both of which have certainly no claim to be considered native plants.

Reference may be made for other notes and particulars of the species to—

- H. Ridley, in "Journ. Bot.," 1885, t. 253, p. 1.
 P. Ewing, in "Trans. Glasgow Nat. Hist. Soc.," 1889, pp.
 166-169.
 G. C. Druce, in "Scottish Naturalist," vol. i., N.S., 1883-84,
 p. 264.
 Ar. Bennett, in *l.c.*, 1887, p. 182.

[*Note*.—The occurrence of this plant in 1894 on a piece of made-up ground in Aberdeen, on which many foreign plants, including several American species, have appeared, a large number of them not having been observed before in this district ("Ann. Scot. Nat. Hist.," 1896, p. 239, and 1897, p. 28), supports Mr. Bennett's views as to its origin in Britain, while it adds another county to the list.—J.W.H.T.]

ON THE FLORA OF EIGG.

By SYMERS M. MACVICAR.

THE island of Eigg being mostly composed of Tertiary basalts, it would naturally be expected, as is in fact the case, that its flora would closely correspond with that of Mull, which is almost wholly composed of the same formation, and with Skye, of which the greater part is of similar structure ; but it is to be noted that the flora of Eigg also agrees more closely with those parts of Skye composed of other formations than it does with that of the Dalradian schists of the mainland opposite itself. The low altitudes at which the few alpine plants occur in the island as compared with those on the nearest mainland are interesting. The scarcity or usually scattered occurrence and the weakly aspect of these plants denote that they are tending towards extinction, and that they are now climatically out of their true home on the warm west coast ; and it seems as if, in their effort to save themselves, they have seized on, or retained, the only unoccupied surfaces within reach, viz. the bare face of cliffs, where their long penetrating rootlets could extract moisture from the debris in fissures. Their lower limit is 450 to 500 ft. on the islands, and 1800 to 1900 ft. on the mainland. *Salix herbacea*, L., is an exception, as it occurs only on the Scur, descending to about 900 ft., while on the opposite mainland its usual lower limit is 1900 ft., though in one place it descends to 1600 ft. The low altitude at which alpine plants occur is common to our western islands.

The following list is the result of visits made to Eigg in 1893 and 1895, when I noted 350 species and varieties. Mr. F. W. Miller also visited the island in 1895, and made a list of the plants seen by him. Unfortunately he did not know at the time of my previous searches, so could not specially look for additions. He very kindly placed at my disposal his list with notes, to which I have appended his initials. In his list there are 23 species and varieties unrecorded by me, making a total of 373 species and varieties—a considerable number of plants for an island of 7900 acres,

a large part of which is moorland ; and this cannot be taken as an exhaustive list.

I am indebted to Professor Macpherson, former proprietor of Eigg, for information on various points ; to Mr. Arthur Bennett, F.L.S., for notes on plants sent to him ; and to the Rev. W. Moyle Rogers, F.L.S., who named the *Rubi* and *Rosæ*.

THALICTRUM DUNENSE, *Dum.*—Common on sandy shores at Laig and Poll nam Partan.

ANEMONE NEMOROSA, *L.*—Cleadales.

RANUNCULUS HEDERACEUS, *L.*—Cleadales. *W. F. Miller.*

RANUNCULUS FLAMMULA, *L.*—Locally common.

RANUNCULUS ACRIS, *L.*—Common. A form grows on the sandy shore at Laig, with dense spreading yellow hairs on the stem, and with the rootstock occasionally horizontal (var. *Steveni*, Andr.).

RANUNCULUS REPENS, *L.*—Common.

CALTHA PALUSTRIS, *L.*—Not common.

TROLLIUS EUROPÆUS, *L.*—Cleadales cliffs.

PAPAVER DUBIUM, *L.*—Plentiful in an oatfield and on adjoining sand dunes at Laig.

NASTURTIUM OFFICINALE, *R. Br.*—Rare ; in a stream at Laig.

ARABIS HIRSUTA, *Scop.*—Cleadales cliffs, at 450-500 ft. alt. "Less hairy than the type, but more so than var. *glabrata* ; seems to me to be the var. *incisa*, Wallroth ("Sched. Crit.," p. 357, 1822)"—Arthur Bennett *in litt.*

CARDAMINE PRATENSIS, *L.*—Not many plants seen.

CARDAMINE HIRSUTA, *L.*—Roadsides.

CARDAMINE FLEXUOSA, *With.*—Among rocks at the Scur.

DRABA INCANA, *L.*—Not uncommon on Cleadales cliffs, at 450 ft. alt. ; Strath cliffs.

COCHLEARIA OFFICINALIS, *L.*—Shore at Macleod's Cave.

SISYMBRIUM OFFICINALE, *Scop.*—Roadside near the harbour. *W. F. M.*

BRASSICA SINAPISTRUM, *Boiss.*—A weed of cultivation in fields.

BURSA PASTORIS, *Weber.*—A weed of cultivation near houses.

CAKILE MARITIMA, *Scop.*—In patches on the sandy shore, Laig.

RAPHANUS RAPHANISTRUM, *L.*—In fields of oats, and on the shore at Laig; the plant of the latter locality being probably *R. Landra*, Moretti.

VIOLA PALUSTRIS, *L.*—Locally common.

VIOLA RIVINIANA, *Reich.*—Few plants seen; at the Scur.

VIOLA TRICOLOR, *L.*—A weed of cultivation.

VIOLA ARVENSIS, *Mun.*—A weed of cultivation.

VIOLA CURTISII, *Forster.*—Rare; sandy shore, Laig.

POLYGALA VULGARIS, *L.*—Rather common.

POLYGALA SERPYLLACEA, *Weihe.*—Common.

SILENE MARITIMA, *With.*—Cliffs at Macleod's Cave. In great abundance on the cliffs of Strath.

SILENE ACAULIS, *L.*—Cleadales cliffs in some plenty, descending to 450 ft. alt.; also on Strath cliffs.

LYCHNIS DIOICA, *L.*—Rare.

LYCHNIS FLOS-CUCULI, *L.*—Rather rare.

CERASTIUM TETRANDRUM, *Curtis.*—Sandy shore, Laig.

CERASTIUM GLOMERATUM, *Thuill.*—Common.

CERASTIUM TRIVIALE, *Link.*—Rather common.

STELLARIA MEDIA, *Cyr.*—Common near cultivation.

STELLARIA ULIGINOSA, *Murr.*—Not common.

ARENARIA SERPYLLIFOLIA, *L.*—Rare; Poll nam Partan.

ARENARIA PEPLOIDES, *L.*—Not common; shore at Laig.

SAGINA PROCUMBENS, *L.*—Common.

SAGINA SUBULATA, *Presl.*—Rather common; Laig road; summit of Scur, etc.

SPERGULA ARVENSIS, *L.*, var. *sativa* (*Bænn.*)—Weed of cultivation.

MONTIA FONTANA, *L.*, a *repens*, *Pers.*—Rare; Macleod's Cave.

β erecta, *Pers.*—Rare; Cleadales.

HYPERICUM ANDROSÆMUM, *L.*—Not common. Macleod's Cave; near the "Cottage."

HYPERICUM QUADRATUM, *Stokes.*—Rather common; side of streams and sea cliffs.

HYPERICUM HUMIFUSUM, *L.*—Uncommon. Laig road; near the "Cottage."

HYPERICUM PULCHRUM, *L.*—Common.

LINUM CATHARTICUM, *L.*—Common.

GERANIUM MOLLE, *L.*—Near the Hotel, and in several places.
W. F. M.

- GERANIUM DISSECTUM, *L.*—Sandy shore, Laig.
- GERANIUM ROBERTIANUM, *L.*—Uncommon ; Cleadale.
- ERODIUM CICUTARIUM, *L'Hérit.*—Sandy shore, Laig. *W. F. M.*
- OXALIS ACETOSELLA, *L.*—In several places.
- ILEX AQUIFOLIUM, *L.*—Native. One stunted tree on Strath cliffs.
- TRIFOLIUM PRATENSE, *L.*—Common in fields.
- TRIFOLIUM MEDIUM, *L.*—Very common ; banks, roadsides, shores, etc.
- TRIFOLIUM REPENS, *L.*—Rather common.
- TRIFOLIUM PROCUMBENS, *L.*—One plant noticed, Laig Bay. *W. F. M.*
- TRIFOLIUM DUBIUM, *Sibth.*—Uncommon ; only near cultivation.
- ANTHYLLIS VULNERARIA, *L.*—Common.
Var. *Allioni*, *DC.* *W. F. M.*
- LOTUS CORNICULATUS, *L.*—Common.
Var. *crassifolius*, *Pers.*—Occurs on the shore.
- VICIA CRACCA, *L.*—In fields ; only near cultivation.
- VICIA SEPIUM, *L.*—Laig.
- LATHYRUS PRATENSIS, *L.*—Rather common.
- LATHYRUS MONTANUS, *Bernh.*—Rather common.
- PRUNUS SPINOSA, *L.*—Native ; plentiful locally ; Poll nam Partan, etc.
- SPIRÆA ULMARIA, *L.*—Locally common.
- RUBUS IDÆUS, *L.*—Native. Cleadale, ascending to 450 ft. alt.
- RUBUS PULCHERRIMUS, *Neum.*—Uncommon. "Just the Scandinavian plant" (*Rev. W. Moyle Rogers in litt.*).
- RUBUS VILICAULIS, var. *insularis* (*F. Aresch.*)—Rather common.
- RUBUS GRATUS, *Focke.*—Laig Bay.
- RUBUS RADULA, *Weihe.*—Laig Bay.
- RUBUS THYRSIGER, *Bab.*—Laig Bay. Differs somewhat from the type, but is very like a plant from Westmeath, Ireland, gathered by the *Rev. E. F. Linton*. This species has not been hitherto recorded for Scotland.
- RUBUS CORYLIFOLIUS, *Sm.*—Rather common in several forms.
- RUBUS SAXATILIS, *L.*—Cleadale cliffs, at 450 ft. alt. ; Strath cliffs.
- GEUM RIVALE, *L.*—Rare ; Cleadale.
- FRAGARIA VESCA, *L.*—Common.
- POTENTILLA SILVESTRIS, *Neck.*—Common.
- POTENTILLA ANSERINA, *L.*—Uncommon.

POTENTILLA PALUSTRIS, *Scop.*—Rare ; in a ditch near the School-house.

ALCHEMILLA ARVENSIS, *Scop.*—On banks ; very few plants seen.

ALCHEMILLA VULGARIS, *L.*—Specimens sent to Rev. E. F. Linton were named by him *A. pratensis*, Schmidt, and *A. alpestris*, Schmidt. The latter is the more common plant.

AGRIMONIA EUPATORIA, *L.*—Rare ; cliffs near Macleod's Cave.

ROSA PIMPINELLIFOLIA, *L.*—Very common ; flowers white or light pink.

ROSA INVOLUTA, *Sm.*—Rare ; near the harbour.

ROSA TOMENTOSA, *Sm.*—Not common.

ROSA CANINA, *L.*—Not common. Rev. W. Moyle Rogers named the specimens sent var. *lutetiana* (Leman) ; var. *verticillacantha*, "Anglorum, not of Merat, I believe" ; and var. *arvatica*, Baker.

ROSA GLAUCA, *Vill.*—Not common.

CRATÆGUS OXYACANTHA, *L.*—Native ; on cliffs near Macleod's Cave.

SAXIFRAGA AIZOIDES, *L.*—Cleedale cliffs.

SAXIFRAGA HIRTA, *Haw.*—Cleedale cliffs at 450 ft. alt. ; very common on Strath cliffs, descending to 80 ft. above sea-level. The Eigg plant, judging from the characters given in the Supplement to "Eng. Bot.," ed. 3, by N. E. Brown, is intermediate between *S. hirta*, Haw., and *S. hypnoides*, *L.* Mr. Arthur Bennett said of the specimens sent him, "I should be inclined to call them *S. hirta*, Haw., inclining to *S. hypnoides*, or shading off to that plant."

CHRYSOSPLENIUM OPPOSITIFOLIUM, *L.*—Uncommon.

PARNASSIA PALUSTRIS, *L.*—Not many plants seen.

RIBES RUBRUM, *L.*, var. *spicatum* (Robs.)?—Rocks near Macleod's Cave.

SEDUM ROSEUM, *Scop.*—Rather common ; Scur. Cleedale and Strath cliffs.

SEDUM ANGLICUM, *Huds.*—Common.

SEDUM ACRE, *L.*—Rare ; sandy shores.

DROSER A ROTUNDIFOLIA, *L.*—Few plants seen ; moor near the Scur.

MYRIOPHYLLUM ALTERNIFLORUM, *DC.*—Hill lochs.

CALLITRICHE STAGNALIS, *Scop.*—Uncommon.

(CALLITRICHE HAMULATA, *Kuetz.*—Cleedale ; requires confirmation.)

- EPILOBIUM PARVIFLORUM, *Schreb.*—Rare ; Cleadale.
- EPILOBIUM MONTANUM, *L.*—Rather common.
- EPILOBIUM ADNATUM, *Grisebach.*—Rare ; Cleadale.
- EPILOBIUM OBSCURUM, *Schreb.*—Near Musical Sands. *W. F. M.*
- EPILOBIUM PALUSTRE, *L.*—Uncommon ; a small narrow-leaved form grows at the side of the hill lochs.
- EPILOBIUM ALSINEFOLIUM, *Vill.*—Foot of Cleadale cliffs at about 400 ft. alt.
- CIRCEA LUTETIANA, *L.*—Very rare ; roadside above the harbour.
- CIRCEA ALPINA, *L.*—Very rare ; below Cleadale cliffs.
- HYDROCOTYLE VULGARIS, *L.*—Uncommon.
- ERYNGIUM MARITIMUM, *L.*—In some quantity on the sand dunes, Laig Bay.
- SANICULA EUROPÆA, *L.*—Uncommon.
- CONIUM MACULATUM, *L.*—Several plants on waste ground near houses, Kildonan. *W. F. M.*
- CONOPODIUM DENUDATUM, *Koch.*—Common.
- MYRRHIS ODORATA, *Scop.*—Several plants near a house, Kildonan. *W. F. M.*
- CENANTHE CROCATA, *L.*—Uncommon.
- LIGUSTICUM SCOTICUM, *L.*—Rocks on the shore in the harbour.
- ANGELICA SYLVESTRIS, *L.*—Rather common ; Cleadale, Strath, Macleod's Cave.
- HERACLEUM SPHONDYLIIUM, *L.*—Uncommon ; Poll nam Partan.
- DAUCUS CAROTA, *L.*—In plenty on sand dunes, Laig Bay.
- HEDERA HELIX, *L.*—Native ; common on sea cliffs.
- LONICERA PERICLYMENUM, *L.*—Uncommon ; Cleadale ; above the harbour.
- GALIUM BOREALE, *L.*—Cleadale and Strath cliffs.
- GALIUM VERUM, *L.*—Very common ; banks, roadsides, etc.
- GALIUM SAXATILE, *L.*—Common.
- GALIUM PALUSTRE, *L.*, var. *Witheringii* (Sm.)—Rather common.
- GALIUM APARINE, *L.*—Uncommon ; shore near Macleod's Cave.
- VALERIANA SAMBUCIFOLIA, *Willd.*—Uncommon.
- SCABIOSA SUCCISA, *L.*—Common ; fields, cliffs, etc.
- EUPATORIUM CANNABINUM, *L.*—Locally common ; Cleadale ; Macleod's Cave.

SOLIDAGO VIRGAUREA, *L.*—Common on the Scur, sometimes dwarf.

BELLIS PERENNIS, *L.*—Common.

ANTENNARIA DIOICA, *R. Br.*—Rather common.

GNAPHALIUM ULIGINOSUM, *L.*—Covers the bottom of a dried-up small loch, Strath.

GNAPHALIUM SYLVATICUM, *L.*—Uncommon ; Laig.

ACHILLEA MILLEFOLIUM, *L.*—Common.

ACHILLEA PTARMICA, *L.*—Uncommon ; Laig.

MATRICARIA INODORA, *L.*, var. *salina*, *Bab.*—Shores ; Laig Bay, Poll nam Partan.

ARTEMISIA VULGARIS, *L.*—Common in cultivated fields.

TUSSILAGO FARFARA, *L.*—Rare ; roadside above the harbour.

PETASITES OFFICINALIS, *Mænh.*—Side of stream at Laig Bay, in plenty.

SENECIO VULGARIS, *L.*—Common ; cultivated fields, roadsides, and waste places.

SENECIO JACOBÆA, *L.*—Common.

Var. *flosculus* (*Jord.*)—Sand dunes at Laig Bay.
W. F. M.

SENECIO AQUATICUS, *Huds.*—Uncommon ; ditch, side of Laig road.

CARLINA VULGARIS, *L.*—Very rare ; sea cliffs on the south of the island.

ARCTIUM MINUS, *Bernh.*—Rare ; roadside above the harbour.

CNICUS LANCEOLATUS, *Willd.*—Common.

CNICUS PALUSTRIS, *Willd.*—Rather common.

CNICUS HETEROPHYLLUS, *Willd.*—Cleadales cliffs, at 450 ft. alt.

CNICUS ARVENSIS, *Hoffm.*—Very common ; cultivated fields, roadsides.

CENTAUREA NIGRA, *L.*—Common.

†CICORIUM INTYBUS, *L.*—Sides of cultivated fields near the Hotel.

LAPSANA COMMUNIS, *L.*—Uncommon.

CREPIS VIRENS, *L.*—Common in some fields.

HIERACIUM PILOSELLA, *L.*—Uncommon ; Laig road.

HIERACIUM ANGLICUM, *Fr.*—Scur.

HIERACIUM IRICUM, *Fr. (teste F. J. Hanbury).*—Cleadales and Strath cliffs.

HIERACIUM VULGATUM, *Fr.*—Scur.

HIERACIUM CORYMBOSUM, *Fr. (teste F. J. Hanbury).*—Poll nam Partan. *W. F. M.*

HYPOCHÆRIS RADICATA, *L.*—Fields.

LEONTODON AUTUMNALIS, *L.*—Common.

Var. *pratensis* (Koch).—On the Scur.

TARAXACUM OFFICINALE, *Web.*—Roadsides.

TARAXACUM PALUSTRE, *DC.*—Scur, among wet rocks.

SONCHUS OLERACEUS, *L.*—*W. F. M.*

SONCHUS ASPER, *Hoffm.*—Probably native on sea cliffs; a similar form grows on sea cliffs in Skye, and on the mainland opposite Eigg.

SONCHUS ARVENSIS, *L.*—Sand dunes, Laig Bay. *W. F. M.*

LOBELIA DORTMANNA, *L.*—Common in the hill lochs.

†*CAMPANULA RAPUNCULOIDES*, *L.*—Several plants among corn, Laig. *W. F. M.*

CAMPANULA ROTUNDIFOLIA, *L.*—Generally common on north and east sides.

Var. *lancifolia*, Mert. and Koch.—On Cleadale and Strath cliffs, at 450-500 ft.

VACCINIUM MYRTILLUS, *L.*—Rare.

CALLUNA ERICA, *DC.*—In plenty.

ERICA TETRALIX, *L.*—Common.

ERICA CINEREA, *L.*—Very common.

PYROLA MEDIA, *Sw.*—Rare. In a few places above the harbour.

ARMERIA MARITIMA, *Willd.*—On the shore.

PRIMULA ACAULIS, *L.*—Common.

LYSIMACHIA NEMORUM, *L.*—Rather common.

GLAUX MARITIMA, *L.*—Common on the shore.

ANAGALLIS ARVENSIS, *L.*—Cornfield, Poll nam Partan. *W. F. M.*

ANAGALLIS TENELLA, *L.*—Uncommon; Kildonan; near Macleod's Cave.

ERYTHRÆA CENTAURIUM, *Pers.*—Rather common near the harbour.

GENTIANA CAMPESTRIS, *L.*—Locally common. Cleadale; harbour.

MENYANTHES TRIFOLIATA, *L.*

LYCOPSIS ARVENSIS, *L.*—Sandy shore near cultivation, Laig Bay.

PNEUMARIA MARITIMA, *Hill.*—Very rare; shore at Macleod's Cave.

MYOSOTIS CÆSPITOSA, *F. Schultz.*—Rather common about wet rocks, Cleadale; Strath.

MYOSOTIS REPENS, *D. Don.*—Uncommon; ditch at side of Laig road.

(To be continued.)

ZOOLOGICAL NOTES.

Lesser Shrew on the summit of Ben Nevis.—I was up Ben Nevis on the 27th of August last. On the 25th the cat belonging to Mr. J. Niel, the cook employed in the Observatory, brought into the kitchen a Lesser Shrew (*Sorex minutus*). Mr. Niel says the cat never goes but a short distance from the huts. I thought a Shrew from the highest altitude of Great Britain an interesting capture and worthy of record.—H. W. FIELDEN, Wells, Norfolk.

Sowerby's Whale in the Moray Firth.—In the "Nairnshire Telegraph" of 28th October last there appeared a notice of a Whale aground a mile and a half east of Nairn harbour. It was supposed to be a Bottle-nosed Whale. About a month afterwards I visited the place, and found the carcass somewhat damaged, but still fresh. I at once saw that it was not *Hyperoodon rostratus*, as I had seen that species in the flesh before. It turns out to be a male specimen of Sowerby's Whale (*Mesoplodon bidens*), nearly fifteen feet in length and nine in girth. I secured the skull and most of the skeleton. Sir Wm. Turner saw the skull, and confirmed my identification of the species.

The whole animal was black from snout to tail on ventral as well as dorsal surface, the skin "shining like a well-polished shoe." The blow-hole was very slightly crescentic, almost a transverse slit. The following are some measurements of the skull and other parts :—Basal length of skull, 2 ft. 4 in. ; length of rostrum, 1 ft. 6 in. ; breadth of rostrum (middle), 2 in. ; greatest breadth of skull, 11½ in. ; height of skull through nares, 10½ in. ; length of sternum, 1 ft. 9 in. ; length of flipper, 1 ft. 8 in. ; greatest breadth of flipper, 6 in. ; length of humerus, 5½ in.

This appears to be the only specimen of *Mesoplodon bidens* recorded from the Moray Firth since Sowerby's type, *Physeter bidens*, was cast ashore ninety-six years ago, within sight of the spot where the present specimen was found.—WM. TAYLOR, Lhanbryde.

Barred Warbler at Dhu Heartach Rock, Argyleshire.—Mr. William Davidson, principal keeper of the lighthouse on Dhu Heartach Rock (off the Argyleshire coast, 15½ miles S.W. of Iona), kindly forwarded to us the remains of an immature specimen of the Barred Warbler (*Sylvia nisoria*). This rare visitor was found dead at the foot of the lantern on the morning of the 9th of September last, and had been killed either early that morning or during the previous night. The Barred Warbler has only once before been recorded for Scotland, namely at Broadford, in Skye, on the 16th of August 1884.—J. A. HARVIE-BROWN and WM. EAGLE CLARKE.

Wryneck in Orkney.—A Wryneck (*Jynx torquilla*) was shot on the Island of Shapinshay on the 14th September last and forwarded to me for identification. I bought it, and it proved to be an adult female.—THOMAS M'CRIE, Kirkwall.

Hoopoe in Stirlingshire.—We have received for preservation a Hoopoe (*Upupa epops*) from Mr. Aitken Couper, Stirling, which was caught by his son on Menstrie Hill on the 16th of November last.—D. CROCKART & Co., Stirling.

Roller in East Lothian.—An adult female Roller (*Coracias garrulus*) was shot at Tynningham, Prestonkirk, on the 28th of September last, and is the second example that to my knowledge has occurred here.—HADDINGTON, Tynningham.

Snowy Owl in Sutherland.—An almost pure white Snowy Owl (*Nyctea scandiaca*)—a male, judging from its size—was obtained by Mr. D. Barclay, gamekeeper, at Forsinard, Sutherland, on or about the 12th of December 1896.—T. E. BUCKLEY, Inverness.

Greenland Falcon in Skye.—A Greenland Falcon (*Falco candicans*) was sent in to Inverness for preservation, which was shot near Portree, Skye, in December 1896. It was eating a Grouse whose head had been knocked off, probably by the Falcon.—T. E. BUCKLEY, Inverness.

Male Peregrine Falcon Incubating.—On the 22nd of May last the keeper here shot a female Peregrine Falcon (*Falco peregrinus*) as she flew off her nest. On the 25th I went up with two men and a rope for the purpose of taking the eggs. On approaching the cliff where the nest was situated, the male bird flew out from the nest, and on taking the eggs they proved to be quite warm and had evidently been incubated by him after the death of his mate. I shall be glad to know if this is usual.—J. C. STEWART, Glenmoidart.

Osprey in Inverness-shire.—On the 18th of August last an Osprey (*Pandion haliaetus*) was sent in from Moy Hall, the seat of The Mackintosh, to Mr. Mackay for preservation.—T. E. BUCKLEY, Inverness.

Night Heron in Barra.—I shot a "Night Heron" (*Nycticorax griseus*) on the east coast of the island of Barra on 12th October, after a snowstorm and gale on the 11th. It rose from some sea-weed-covered rocks which had just been uncovered by the tide. It was submitted in the flesh to Mr. Eagle Clarke for inspection, and he confirms my opinion that it is an immature bird. By dissection it proved to be a male.—C. V. A. PEEL, Barra.

Shoveller in East and Mid Lothian.—On 17th April 1896 I observed a Shoveller (*Spatula clypeata*) drake on a small loch at the base of the Lammermuirs. On my first visit the bird was resting on a piece of open water in company with a Coot, and both birds rose

and flew off as I drew near. Later in the day I returned to the loch, and found the Shoveller lying up in a thick bed of equisetum; it allowed me to approach within a few yards before rising, as if unaware of the conspicuous attraction it formed by its white lower neck. In the autumn I saw in Mr. Small's shop a female Shoveller, which he had received on 8th September from Gladhouse Reservoir in Midlothian.—ROBERT GODFREY, Edinburgh.

Turtle Dove in West Lothian.—On the 20th of October 1896 Mr. David M'Diarmid, head gamekeeper to the Earl of Rosebery, shot a Turtle Dove (*Turtur communis*) which rose from a stubble-field in Dalmeny Park. The occurrence of this bird in the county is sufficiently rare to deserve being placed on record in the "Annals."—CHAS. CAMPBELL, Dalmeny Park.

Turtle Dove in West Fife.—A young male Turtle Dove (*Turtur communis*) of the year was shot by Mr. C. N. Johnston on 4th September on the farm of Waulkmill, estate of Pitliver, parish of Torryburn, Fifeshire, about 400 yards from the Forth, and at the side of a strip of plantation out of which it rose.—J. J. DALGLEISH, Brankston Grange, Fife.

Turtle Dove in Perthshire.—On the 1st of October, when out shooting in Glenshee, about 20 miles north of Blairgowrie, we shot a Turtle Dove (*Turtur communis*). Perhaps the observation may be of sufficient value for insertion in the "Annals of Scottish Natural History."—GEORGE HENDERSON, London.

Turtle Dove in West Ross-shire.—I saw a Turtle Dove (*Turtur communis*) here in October 1895, and another in June 1896.—OSGOOD H. MACKENZIE, Inverewe.

Turtle Dove in Caithness.—A Turtle Dove (*Turtur communis*) was shot at Shurrery by the keeper there in July last.—JAMES STIRLING, Garden.

Stock Dove on Cumbrae.—During a short visit to Cumbrae I saw a pair of Stock Doves (*Columba livia*) on 18th August. I think they were nesting in the rabbit burrows among the hazel scrub near the shore on the western side of the island.—BRUCE CAMPBELL, Edinburgh.

Capercaillie in Linlithgowshire.—On the 9th of November last I shot an old hen Capercaillie (*Tetrao urogallus*) in a fir strip on Lord Hopetoun's estate of Tartraven, situated on the Bathgate hills about $3\frac{1}{2}$ miles from Linlithgow and the same from Bathgate. I thought it was a gray hen when I fired at it in thick cover, or I should not have shot it.—N. LECKIE, Houstoun.

Hybrid Blackcock and Capercaillie in Peeblesshire.—On 2nd October a cross between a Blackcock (*Tetrao tetrix*) and Capercaillie (*Tetrao urogallus*) was shot while I was shooting on Netherurd Mains, Peeblesshire. I believe there are a few more

about, and that they must be breeding, as the numbers always are about the same. Two were shot on Netherurd four years ago, but I do not know what became of them, and did not see them. The specimen now recorded takes most decidedly after the Blackcock.—GEORGE H. GIBSON CARMICHAEL, Mountaincross.

Spotted Crake in Islay.—As I understand the occurrence of the Spotted Crake (*Porzana maruetta*) has rarely been observed on the west coast of Scotland farther north than the Firth of Clyde, I may mention that a specimen of this bird was shot by one of my sons on the 29th September last in the island of Islay. I have every reason to suspect that the bird breeds here on a marsh close to this house. It has been suggested that an effort should be made next year to discover its nest, but this, I fear, is practically impossible. The marsh is a very large one, and some twenty acres of its extent is a quagmire, covered with sedges, and quite inaccessible to human foot. In fact, in two cases within my knowledge persons have narrowly escaped death on attempting it. Water Rails are abundant in the marsh, and I doubt not the Crakes have in consequence often escaped observation.—R. SCOT SKIRVING, Foreland, Islay.

Spotted Crake in Moray (Leach).—A Spotted Crake (*Porzana maruetta*) was shot on the shores of the Beaully Firth by Mr. F. Cameron, Moniack Castle, on 26th September. This species has been but rarely recorded from any locality on the mainland north of the river Ness.—T. E. BUCKLEY, Inverness.

Great Snipe near St. Andrews.—On the 22nd of September last I shot a Great Snipe (*Gallinago major*) in a small marsh some four miles inland from St. Andrews. It was a female weighing 7½ oz. On the same day I saw a considerable number of Common Snipe in the marsh, very wild and unsettled, and to my knowledge freshly arrived.—J. R. M. COOK, St. Andrews.

Little Stint in the Clyde area.—Writing of the Little Stint (*Tringa minuta*), Gray states, in his "Birds of the West of Scotland": "I am not yet able to include this bird as a western species." As this statement has been copied over and over again since the publication of Gray's work (1871), and as Mr. Service can apparently only answer for three examples in Scottish Solway, the following, which relates chiefly to the Clyde area, may be of interest. It has been shot at Ross by Sir George H. Leith Buchanan, as stated by Mr. Lumsden in his "Guide to the Natural History of Loch Lomond." My correspondent Mr. J. Burnett Dick has shot it on the shores of the Clyde between Dumbarton and Helensburgh; and on one occasion at Loch Swein ("Argyle" area), while waiting for ducks, he was tempted to shoot at a flock of small waders which were passing within range, and brought down several Little Stints. Mr. Charles Berry informs me (*in litt.* 16th March 1896) that in September 1890

he saw five at Ballantrae Bay, of which number he killed four, and again in September 1893 he shot one at Lendalfoot. Two of the specimens he had procured I saw in his collection. One of these he gave me, and I sent it to Mr. Harvie-Brown. On the 29th of August 1896 I saw one on the sands at Turnberry beside two Knots. Mr. M'Culloch, the taxidermist in Glasgow, tells me he has never had it for preservation, but he handled one at Port Bannatyne, Bute, which was in the possession of Mr. Frew, an artist, who had shot it out of a number in Etterick Bay, Bute. I incline to the belief that this species is a regular autumn visitor in small numbers to this area, and that there are more Little Stints than observers.—JOHN PATERSON, Glasgow.

Gray Phalarope in Caithness.—A Gray Phalarope (*Phalaropus fulicarius*) was sent in to Mr. Macleay, Inverness, for preservation, from Watten, Caithness, on 23rd September 1896.—T. E. BUCKLEY, Inverness.

Sabine's Gull in Kilbrennan Sound.—The description given in the October number by Mr. W. Evans of a Sabine's Gull (*Xema sabini*) in Aberlady Bay convinces me that I saw the same species in August 1894 on the coast near Campbeltown in this county. I was hand-line fishing outside Campbeltown harbour in a small steam-launch. Many gulls came round us to pick up bits of the bait, etc. One of them caught my eye at once as unlike any bird I had ever seen. It was a very small gull, although its forked tail, which was conspicuous, led me at first to think it was a Tern. But its more robust form rendered that impossible. I have now no doubt it was a Sabine's Gull. I feel sure that many of the rarer Gulls are really more common than is supposed. The very small proportion of sea-going observers who know anything of ornithology, together with the general uniformity of aspect among all Gulls, make the recognition of species a rare accident. Many years ago, when on my way to America, we stopped as usual at Queenstown. The liner I was in was surrounded by scores of Gulls. Among them I saw one wholly white—not a speck of black or gray on any part of its plumage. I do not know what the species was. But I could not help noticing that among the many passengers, British and American, on board not a human being but myself took the least notice of a rare and fine Gull.—ARGYLL, Inveraray.

Little Gulls at Dunbar.—On the 11th September last I was informed that two strange birds had been shot at the mouth of the Biel burn, Belhaven, about two miles from Dunbar. I managed to secure the birds, and on examination identified them as two immature specimens of the Little Gull (*Larus minutus*)—from their plumage, I should say birds of the year. Both were sitting together on a rock near the edge of the water, and appeared very tame.—D. BRUCE, Dunbar.

***Rana esculenta* in Scotland (a correction).**—I forwarded specimens of the Frogs which I obtained from Kincardineshire last March, as recorded in the "Annals," 1896, p. 162, to Mr. G. A. Boulenger, F.R.S., and he informs me that the species is *temporaria*, and not *esculenta* as I supposed. While regretting that I should have made a mistake, I am glad the matter has been set at rest, at least until some one with more enterprise has actually discovered *R. esculenta* in Scotland. The dark patch at the side of the head in *temporaria*, on which so much emphasis is laid as a distinguishing feature, may be absent; while it may be present, Mr. Boulenger tells me, in *esculenta*. Furthermore, vocal sacs are present in the males of both species, and are not absent in *temporaria* as is usually supposed. In *temporaria*, however, they are internal, and not external as in *esculenta*. If my error is the means of bringing about corrections in the text-books on which I relied for distinguishing characters between the two species, I am not sorry I made it.—PHILIP J. WHITE, University College, Bangor.

Hebridal Argentine on the West Ross-shire Coast.—I caught a "Hebridal Argentine" (*Argentina sphyraena*) in August last, on a small line, in about 40 fathoms water, at the mouth of Lochbroom. This is only the second specimen of this fish that has come under my notice. The former one I got last year near the same place.—J. A. FOWLER, Inverbroom.

***Helix lamellata*, Jeff., in East Lothian.**—This pretty little shell, which has not, so far as I know, been previously reported from any part of the Lothians, was found by me in considerable abundance on the 16th of last September in a shady part of the glen which runs through the grounds of Yester, near the foot of the Lammermoor Hills in Haddingtonshire. The spot where it occurred is about a couple of miles above the village of Gifford, but I have no doubt it will, when closely looked for, be discovered in other places in the neighbourhood. Most of the shells contained living molluscs, and were found adhering to fallen leaves, chiefly those of the rhododendron. Among the other land mollusca collected on the same occasion were *Helix granulata* (= *sericea*) and *H. fusca*. I cannot find that *H. lamellata* has previously been noticed lower down the Forth valley than Craigquarter Wood near Stirling, where it was found by Mr. T. Scott a few years ago, so that the present record carries its distribution a long way farther to the east. Prior to 1837, however, the late Dr. Johnston found it, "though very seldom," in Berwickshire ("Mag. Zool. and Bot.," i. 201).—WILLIAM EVANS, Edinburgh.

***Geotrupes typhœus* (L.) in Ayrshire.**—I am pleased to be able to record the occurrence of this beetle in Ayrshire. Three specimens—two males and a female—were taken by Mr. Thomas

Wilson of Ayr, while we were walking over Irvine Moor with a small party of the Kilmarnock Ramblers Society, on the 18th April last. Mr. Wilson again visited the moor on 16th May, and found another male. *Geotrupes typhaeus* has already been recorded for Arran by Mr. Wm. Evans ("Annals," 1895, p. 198), so the above is the second locality for the species in the Clyde area. A specimen was submitted to Mr. G. C. Champion, F.Z.S., for verification.—ANDERSON FERGUSON, Ayr.

Exomias araneiformis, Schrank., in Clyde and Solway.—Three specimens of this Weevil were collected near Ayr in April 1894, and Mr. Morris Young has taken five in the Paisley district. Both of these localities are in "Clyde." I found another specimen in June last near the village of Barr, which lies in that part of Ayrshire included in "Solway." Canon Fowler, in his "Coleoptera of the British Islands," says regarding the occurrence of this species in Scotland: "Nor has Dr. Sharp ever come across a Scotch example, although it must be admitted that Murray records it as 'occasional' in Scotland." Specimens were submitted to Mr. G. C. Champion, F.Z.S., for verification.—ANDERSON FERGUSON, Ayr.

Vanessa antiopa in Aberdeenshire.—I have pleasure in recording the capture of this butterfly in Aberdeenshire during the past season. First, one was taken at Rubislaw on the 14th September by Mr. Alexander Park, and is now in the splendid collection of Mr. Horne of Aberdeen. A second specimen was captured, between Logierieve and Esslemont, by Mr. Youngson on the 4th October. It is now in the possession of Mr. Crane of Ellon. A third was seen by Mr. Crane, about six weeks previous to the last record, near the Wool Mill, Ellon. Mr. Crane was within a yard of it, but, not having a net, the butterfly escaped capture. All the specimens belonged to the British type with the pale border to the wings.—WILLIAM COWIE, Aberdeen.

Vanessa antiopa in Shetland.—I received a specimen of this fine butterfly—the Camberwell Beauty of collectors—from my friend Mr. Frank Traill, who captured it in the Island of Foula on the 31st August last. Foula is about 15 miles west of the mainland of Shetland; and the occurrence of the insect in this somewhat remote isle affords an interesting illustration of the wandering tendency possessed by this handsome butterfly. It is a pale-bordered specimen (? of Scandinavian origin), and has been presented by Mr. Traill to the Scottish National Collection in the Museum of Science and Art, Edinburgh.—W. EAGLE CLARKE.

Acherontia atropos and Alucita polydactyla in Roxburghshire.—I received from Ormiston, in the beginning of September last, a larva of the Death's-head Moth (*Acherontia atropos*), which was found crossing a field road there. *Alucita polydactyla* I took in autumn

1894, and again hybernated specimens in May last. Mr. C. G. Barrett has seen both the autumn and hybernated specimens, and he says: "I cannot find a record of *Alucita polydactyla* in Scotland at all. Yorkshire and Westmoreland appear to be the most northerly localities of which I know."—A. ELLIOT, Caverton, Roxburghshire.

Death's-head Moth in East Lothian.—I have heard of the capture of three examples of the Death's-head (*Acherontia atropos*) in East Lothian this summer, namely—one (now in my possession) at Harelaw near Aberlady, in the beginning of July; one at Haddington about the same time; and one at Tranent. All are said to have been about bee-hives.—WILLIAM EVANS, Edinburgh.

Death's-head Moth in Moray.—A specimen of *Acherontia atropos*, Linn., was captured by Mr. Hossack, Alma Cottage, Elgin, in his garden on the evening of 3rd July last. It seemed to be freshly emerged from the pupa, was under the average size, and had the lower left wing undeveloped.—HENRY H. BROWN, Elgin.

Clifden Nonpareil in Moray.—A specimen of the rare moth *Catocala fraxini*, Linn., was picked up by Mr. R. H. Mackessack, of Woodside and Hatton, on 17th September last, upon the road near Seapark in the parish of Kinloss, Elginshire. It appeared to have been crushed by the foot of some person passing along the road, but was alive when Mr. Mackessack found it. Seapark is in the vicinity of Forres, a district long celebrated for the richness and variety of its Lepidopterous fauna, but *fraxini* is undoubtedly the most interesting discovery which has been made there for some time.—HENRY H. BROWN, Elgin.

Sirex juvencus in Roxburghshire.—On 20th August last the farm steward at Ormiston, in this district, kindly sent me several living specimens, both male and female, of *Sirex juvencus*. He had got them, I understand, when splitting up an old larch gate-post which was perforated with the burrows of the larvæ.—A. ELLIOT, Caverton, Roxburghshire.

Hydrometra stagnorum, L., in Perthshire and Fifeshire.—I do not find this species mentioned in Mr. T. M. M'Gregor's list of Perthshire Hemiptera ("Annals" for October 1893 and April 1894), and am therefore induced to mention its occurrence in the south-western part of the county, where, in April last, I found several examples in a ditch by the roadside at Loch Ard. I have also taken it in Fifeshire at Otterston Loch.—WILLIAM EVANS, Edinburgh.

Boreus hiemalis, L., near Edinburgh.—The "Annals" for July 1895 contains a record by Mr. G. H. Carpenter of a specimen of this curious insect taken by me at Morton, about a couple of miles south of Edinburgh, in November of the previous year. During October and November 1896 I again found the species, but this

time in such numbers, and in so many different places, as to convince me that, in this district at any rate, it is not the rarity it seems to have been hitherto regarded. A favourite habitat is an old moss-grown wall or tree-trunk, and it was while shaking moss from these (patches near the ground are the best) over a newspaper, in order to dislodge any small Coleoptera lurking among it, that the *Borei* were met with. Both sexes occurred. The following are the localities and dates :—Flotterston Bridge, near Glencorse, 20th October, half a dozen specimens; roadside at Morton (the locality in which the 1894 specimen was got), 21st October, common; Dregghorn, 22nd October, three; Comiston, 24th October, six; Swanston, 28th October, a few; Boghall, 9th November, several; Lothianburn, 24th November, one. These localities, it may be noted, are all at or near the base of the eastern spur of the Pentland Hills. Besides the other Scottish localities (Killin and Aberdeen) referred to by Mr. Carpenter, this insect has been taken by Dr. Hardy in Berwickshire (cf. "Scot. Naturalist," January and April 1885).—WILLIAM EVANS, Edinburgh.

***Cheirocrates intermedius*, G. O. Sars, in Loch Fyne.**—A single specimen of this apparently rare Amphipod was recently obtained in some dredged material from Loch Gair (Loch Fyne), which is a new station for this species. Among the Zoological Notes in the "Annals of Scottish Natural History" for January last, *Cheirocrates intermedius* is recorded from the Firth of Forth as an addition to the British fauna; its occurrence in the Clyde district is therefore of interest because extending its distribution, and indicating that, though apparently rare, its distribution may after all not be so very restricted if the species were carefully sought for. As pointed out in the previous "Note," the chief distinctive character of the species is the peculiar form of the second gnathopods—a character which may easily be overlooked. Sars himself admits having at one time confounded this species with *C. sundewalli* (Rathke).—T. SCOTT, Leith.

***Gammarus Duebeni*, Lilljeborg., in a Freshwater Loch near Campbeltown (Cantyre).**—Judging from published records, this Amphipod appears to be usually obtained in water that is more or less brackish, and seldom in fresh water. In the "Annual Report of the Fishery Board for Scotland" for last year, *Gammarus Duebeni* is recorded from a freshwater loch on the uplands behind Lerwick, and I have now to record it from a similar loch, known as "Achy Lochy," situated among the hills to the north of Campbeltown (Cantyre). The water of this loch, like that of the Shetland loch referred to, is used for domestic purposes, which is a sufficient guarantee of its "freshness." *Gammarus Duebeni* may be distinguished from the common *Gammarus pulex* by the shape of the eyes, which are also larger, and by the posterior part of the body and appendages being more hairy.—T. SCOTT, Leith.

Cyclops maerurus, G. O. Sars, and **Canthocamptus northumbrieus**, Brady, in Lochgelly Loch, Fifeshire.—While recently examining a small gathering of Entomostraca from Lochgelly Loch, collected in 1890, but somehow overlooked, several comparatively rare species were obtained; and though most of them have already been recorded in part ii. of my papers on "The Land and Freshwater Crustacea of the District around Edinburgh" (see "Proc. Roy. Phys. Soc. Edin.," 1893, vol. xii.), two of the species are deserving of special notice, viz.: (1) *Cyclops maerurus*, G. O. Sars—so far the Scotch stations for this species are few in number, and there is no previous record for it in the Edinburgh district; (2) *Canthocamptus northumbrieus*, Brady—this has not before been recorded for Fifeshire, and the only other locality within the Edinburgh district where it has been obtained is Duddingston Loch. Both species are fully described and figured in Dr. Brady's monograph of the British Copepoda, vol. i. (1878) and vol. ii. (1880); see also his "Revision of the British Species of Freshwater Cyclopidae and Calanidae" (1891).—T. SCOTT, Leith.

Luidia Sarsi, Düb. and Kor., in the Moray Firth.—A specimen of this Starfish was captured in the Moray Firth, a few miles east of Tarbet Ness, on the 25th of August last. This species is quite distinct from *Luidia ciliaris* (Philippi), which I have also recorded from the Moray Firth. It is much smaller, and has five instead of seven arms. The specimen of *Luidia Sarsi* now recorded measures fully 7 inches across from the extremity of the one arm to that of the one opposite.—T. SCOTT, Leith.

DIGEST OF OBSERVATIONS ON THE MIGRATIONS OF BIRDS AT LIGHTHOUSES AND LIGHTVESSELS, 1880-1887. This has been published in pamphlet form by the British Association, and may be had from the offices of the Association, Burlington House, Piccadilly, London, for sevenpence, post free.

BOTANICAL NOTES AND NEWS.

Lathyrus palustris, L. ("Annals," p. 247, 1896).—By the kindness of Mr. R. L. Praeger of Dublin, I have ascertained that there is no specimen of the above species from Scotland in Mackay's herbarium in Dublin.—ARTHUR BENNETT.

Forms of Euphrasia in Scotland.—Herr R. v. Wettstein has recently issued a very careful and elaborate "Monographie der Gattung Euphrasia" ("Arbeiten d. botanischen Instit." d. K. K. Deutsch Universität in Prag, No. ix., 1896), in which he discusses the assemblage of forms included under the term *E. officinalis*, L., in the wide sense. He admits a large number of species, very fully

described and figured; and each is followed by a long list of the localities whence the author has seen specimens. He gives the following, and the collector's name for each, as growing in Scotland (the numbers being those of the monograph):—

9. *borealis*, Townsend.—Braemar, Melvich Cliffs, and Caithness (all Townsend).

10. *brevipila*, Barnat and Gremli (cf. "Journal of Botany," 1884, p. 167).—"Drosachs" (K. Richter), Foyers and Oban (Townsend).

13. *nemorosa*, Pers.—Braemar (Townsend).

16. *curta*, Fries.—Aberdeen (Marshall).

20. *foulaensis*, Townsend, *in sched.*—Shetland Islands, on the Hammerfeld in Foula (Townsend), Burra Fiord and Vord Hill in Unst, and at Ollaberry (Beeby).

24. *gracilis*, Fries. (cf. "Journal of Botany," xxii. p. 184).—Aberdeen (Nicholson), Scotston Moor near Aberdeen, Foyers, and Oban (Townsend).

30. *scotica*, Wettst. (= *E. paludosa*, Townsend, in "Journal of Botany," xxix. (1891), p. 161, nec *E. paludosa*, R. Br.)—Known only from Braemar.

35. *Rostkoviana*, Hayne (cf. Townsend in "Journal of Botany," xxii. 1884).—Caithness (Linton), Oban (Townsend).

***Linaria viscida*, *Mærch* (*L. minor*) in Kincardineshire.**—The tendency of this little toadflax to make its appearance on railways has been noticed in this journal (i. pp. 142, 204) and elsewhere. I last summer, on 20th June, found it flowering in fair abundance on the railway between Stonehaven and Muchalls, about a mile from the latter station. I believe that this is considerably beyond any previous record for this plant in Scotland. It has of course been introduced, probably in the ballast used on the line.—JAMES W. H. TRAIL.

***Rhinanthus major*, *Ehrh.*, in Aberdeenshire.**—This plant is very plentiful in some parts of Fifeshire, *e.g.* near Elie; and I have gathered it in Forfarshire, also near Elgin; but till recently I had never seen it in the counties of Kincardine, Aberdeen, and Banff, nor has it been recorded from them. In July 1894 I observed in a field of barley at Auchnagatt, about twenty miles north of Aberdeen, a single plant in flower. Again, in August 1895, I found several plants coming into flower on the site of a stackyard near Glassel, in the valley of the Dee, about twenty miles west of Aberdeen. Though north of the Dee, the locality is within the boundary of Kincardineshire, close to its west frontier. On 27th June 1896 I met with this species in some quantity flowering among rye grass in a hayfield near Grandholm, about five miles north of Aberdeen. No doubt the plant has grown in other places

in the district besides those in which I have seen it ; but even they are sufficient to show that it is now somewhat widely distributed in Aberdeenshire and Kincardineshire north of the Dee. Its presence appears evidently due to importation among farm seeds ; but in view of its occurrence in so widely distant places in the last three years, it is strange that it had not been noticed previous to 1894.—JAMES W. H. TRAIL.

Ranunculus fluitans, *Lam.*, in N.E. Scotland.—This aquatic *Ranunculus* is, so far as I have observed, not met with in the streams of Kincardineshire, nor in Aberdeenshire except in the Deveron. In this river I found it in great abundance, in the end of last August, from Turriff to Inverkeithnie, almost as the only representative of its section of the genus. As the Deveron for some distance above Turriff is the boundary between the counties of Aberdeen and Banff, *R. fluitans* may be fairly included in the lists for North Aberdeen, for which it does not stand on record. It had been recorded previously from the Isla, a tributary of the Deveron in Banffshire, as found by Rev. J. Keith, LL.D.—JAMES W. H. TRAIL.

Flora of St. Kilda.—On the return of the party that visited Rockall at the end of last May, under the auspices of the Royal Irish Academy, we cast anchor one dark wet morning in the Bay of St. Kilda. Three hours ashore was all that was allowed to us, and in that brief time I collected as many plants as possible. The flora has already been well worked out by Mr. R. M. Barrington, who spent three weeks on the island in June 1883, and published his results in the "Journal of Botany" for 1886, and by Mr. Alexander H. Gibson, whose list appears in the "Proceedings of the Botanical Society of Edinburgh," in the part issued October 1891. Their lists combined give a flora of about 140 species. Of these, my three hours' search revealed 104 species, and, in addition, two others, *Stellaria uliginosa* and *Equisetum palustre*, which are not recorded in either paper. Another, *Sonchus asper*, doubtfully recorded by Mr. Barrington, I found near the village. The others of my list being covered by those of Mr. Barrington or Mr. Gibson, or both, do not appear to be worth publishing.—R. LLOYD PRAEGER, Dublin.

A Visit to the Loch of Spynie in search of *Utricularia Bremii*.—In June last I paid a hurried visit to the above loch in hopes of meeting with the plant which has been reported as *Utricularia Bremii*. The loch, which is about four miles from Elgin, is a breeding-place of the Black-headed Gull ; and the place is made noisy by the shrill calls of the bird, which occurs in great quantity. I may at once say that I was disappointed in the special object of my search, for I was unable to see any species of *Utricularia* ; but time prevented me from working the marshes on the eastern side.

In the loch I noticed *Ranunculus Baudotii*, *Hippuris vulgaris*, *Littorella juncea*, *Potamogeton gramineus* (*heterophyllus*), *P. perfoliatus*, *P. pectinatus*, *Elodea canadensis*, etc. On the margins *Ranunculus Lingua*, *R. sceleratus*, *Potentilla palustris*, *Galium Witheringii*, *Pedicularis palustris*, *Orchis latifolia*, *Sparganium erectum*, *Triglochin palustre*, *Eleocharis palustris*, *Carex canescens*, *C. rostrata*, *Phragmites communis*, *Equisetum limosum* and var. *fluviale*, *Typha latifolia*, etc., were noticed.

Local tradition asserts that the sea at no distant date came close to the loch, if indeed it was not directly connected with it; but the only plant noticed in the loch which is suggestive of brackish water is the *Ranunculus Baudotii*, which is, I believe, a new county record. The marshes near, however, yield two plants which support the tradition referred to, viz. *Scirpus Tabernamontani* and *Scirpus rufus*, the latter of which gradually merged into the var. *bifolius*.

Salix stipularis is plentiful by the loch; *S. triandra*, *S. aurita* × *cinerea*, and *S. rubra* also occur. The walk from Elgin to Spynie yielded several interesting plants. On sandy ground near the town *Silene conica* occurs. It is, I should think, native there. In cultivated ground near to the town *Fumaria Boraei*, *Papaver Argemone*, *Sisymbrium Thaliana*, *Brassica alba*, *Viola tricolor*, *V. arvensis*, *Lychnis Githago*, *Sagina apetala*, *Malva sylvestris*, *Erodium cicutarium* (as the plant with spotted petals), *Medicago lupulina*, *Sherardia arvensis*, var. *hirsuta*, Baguet, *Myosotis versicolor*, *Veronica agrestis*, *Lamium amplexicaule*, *Arrhenatherum precatorium*, *Scleranthus annuus*, etc., were gathered.

The railway banks afforded †*Medicago sativa*, †*Poterium muricatum*, †*Hieracium rigidum*, †*Campanula rapunculoides*, †*Crepis setosa*, *Daucus Carota*, *Festuca arundinacea*, etc.

†*Chrysanthemum Parthenium* is naturalised on the walls of the Cathedral. Mr. A. Fryer kindly looked at the pond-weeds for me. The Rev. E. F. Linton remarks that the *Salix stipularis* has a great look of *S. Caprea* × *viminalis*. It was abundant on the eastern side of the loch, where plants of undoubted *viminalis* × *Caprea* were growing. I saw *Rubus villicaulis* in Elgin.—G. CLARIDGE DRUCE, M.A., F.L.S.

Notes of Plants observed about Forres and Findhorn.—The sandy district about Findhorn is well worth a visit, and a more prolonged search than I had time to give. *Ranunculus Baudotii* is found between Findhorn and Forres, but is much nearer to the former place. In the same marsh grew *Scirpus rufus*, which here, as at Spynie, merged into the var. *bifolius*—that is, if the length of the bract is the decisive character. An immense quantity of *Erythraea littoralis*, forma *minor*, Hartm., was conspicuous. *Juncus balticus*, *J. Gerardi*, *Carex extensa*, and *Scirpus Tabernamontani* also occurred. On the sandhills and in the neighbourhood of Findhorn I observed

Sisymbrium Sophia, *Senebiera Coronopus*, *Teesdalia nudicaulis*, *Cerastium tetrandrum*, *Malva rotundifolia*, *Ononis repens*, *Trifolium arvense* (in great quantity), *Anthriscus vulgaris*, *Filago minima*, *Carduus pycnocephalus*, *Centaurea Cyanus*, *Sonchus asper*, *Lamium purpureum*, *Plantago Coronopus*, *Atriplex Babingtonii*, *Urtica urens*, *Triglochin maritimum*, *Carex arenaria*, *Agrostis alba*, var. *maritima*, *Agrostis pumila*, *Poa subcærulea*, *Bromus sterilis*, *Agropyron repens*, var. *barbatum*, *A. junceum*, *Elymus arenarius*, and *Koeleria cristata*. In the neighbourhood of Forres, on the southern side of the river Findhorn, I found †*Berberis* (but not native), *Papaver dubium*, *P. Argemone*, *Fumaria officinalis*, *Cardamine hirsuta*, *C. sylvatica*, *Sisymbrium Sophia*, *Thlaspi arvense*, *Silene Cucubalus*, *Lychnis alba*, *Stellaria Holostea*, *Spergula sativa*, *Malva sylvestris*, *Geranium dissectum*, †*Melilotus officinalis*, †*Trifolium hybridum*, *Vicia angustifolia*, †*Spiræa Filipendula* (on the railway bank), *Rubus villicaulis*, near var. *insularis*, *R. mucronatus*, *Rosa mollis*, *R. tomentosa*, *R. rubiginosa*, *R. glauca*, *R. arvensis* (doubtfully wild), *Pyrus Aria* (? planted), *Ribes Uva-crispa*, *Conium maculatum*, *Anthriscus vulgaris*, *Caucalis Anthriscus*, *Sherardia arvensis*, *Senecio sylvaticus*, *Sonchus asper*, *S. arvensis*, *Veronica hederæfolia*, *V. arvensis*, *V. serpyllifolia*, *Melampyrum pratense*, var. *hians* (plentiful in the woods round the Nelson Monument), *Rhinanthus Crista-galli*, var. *angustifolia*, *Polygonum lapathifolium*, *Rumex domesticus*, *Humulus Lupulus*, *Quercus Robur*, var. *sessiliflora*, *Goodyera repens*, *Juncus balticus* (westwards of Forres, by the river), *Holcus mollis*, *Avena pratensis*, *Arrhenatherum præcatatorium*, *Poa nemoralis*, *P. subcærulea*, *Festuca rubra*, *F. elatior*, *F. arundinacea*, *Bromus sterilis*, *B. mollis*, †*Lolium italicum*, and *Agropyron caninum*.—G. CLARIDGE DRUCE, M.A., F.L.S.

***Caltha radicans*, Forst., in South Aberdeen.**—Fairly typical specimens of this plant were gathered by me in June 1896 in a marsh near the Dee not far from Invercauld. The plants in the locality were uniformly rooting, but the shape of the radical leaves was somewhat variable. The stem leaves were quite like those of my West Ross specimens. In the vicinity ordinary *Caltha palustris* occurred.—G. C. DRUCE.

Discomycetes in Morayshire.—During the meeting of the Scottish Cryptogamic Society at Fochabers on 9th to 11th September the following were picked up, both growing on the ground:—

Geoglossum microsporum, Cooke and Peck.—New to Scotland. In Phillips's "British Discomycetes" it is mentioned only from Clifton in England.

Peziza Crouani, Cooke.—This had previously been found in Scotland only near Aberdeen, by myself.

It may be worth adding that a careful search on the beach west of Lossiemouth among *Elymus* and *Ammophila* failed to yield *Peziza*

ammophila, D. and M. In a similar situation on the coast north of Aberdeen it is abundant every autumn.—JAMES W. H. TRAIL.

Species of Lithothamnion new to Scotland.—Mr. E. A. Batters, in "New or Critical British Marine Algæ" ("Journ. Bot.," September), notes the following from Scotland, identified for him by Mr. M. Foslie of Trondhjem, and mostly described in "Norwegian Forms of Lithothamnion," by Mr. Foslie ("Det. Kgl. Norske Vidensk. Selsk. Skr., 1894").

L. incrustans, Foslie, *l.c.* 94, pl. 18.—Cumbrae, *E. A. B.*

f. *Harveyi*, Foslie, *l.c.* pl. 18, figs. 12-15.—Cumbrae, *E. A. B.*

L. Sonderi, Hauck. ("Meeresalgen," p. 273, pl. 3).—Cumbrae, *E. A. B.*

L. orbiculatum, Foslie, *l.c.* 143, pl. 22, figs. 10-11.—Arran, *E. A. B.*; Sea Mill, *E. M. Holmes*.

L. flabellatum, Rosenvinge ("Grönl.," Havalz., 772, figs. 1-2).

f. *Granii*, Foslie, *l.c.*—Port Bannatyne, Bute, *D. Robertson*.

L. Lenormandi (Aresch.), f. *sublævis*, Foslie, *l.c.* 151.—Berwick, *E. A. B.*

L. Battersii, Foslie ("New or Critical Lithothamnion," 1, figs. 1-5).—Cumbrae, *E. A. B.*

L. corallioides, Crouan ("Fl. Finist.," 152, pl. 20).

f. *australis*, Foslie, *l.c.* 62, pl. 16, figs. 24-31.—Cumbrae *E. A. B.*

f. *flabelligera*, Foslie, *l.c.* figs. 32-37.—Cumbrae, *E. A. B.*; Port Bannatyne, *D. Robertson*.

Scrophularia Ehrharti, *Ster.*—Several beds of this plant were discovered by the Edinburgh Field Naturalists on 17th June last on the side of the river Esk above Musselburgh. It has not been before recorded from this locality.—A. B. STEELE, Edinburgh.

Additions to the known Flora of the South Ebrudes.—In the *Journal of Botany* (October, p. 433), A. Somerville records from Islay the following:—*Buda marina*, Dum., var. *neglecta* (Kindb.); *Potentilla procumbens*, Sebth.; *Erythræa pulchella*, Fr., form or variety; *Polygonum Raii*, Bab.; *Rumex conglomeratus*, Murr.; *Juncus alpinus*, Vill., new to the Hebrides as a whole; *Sparganium minimum*, Fr. (?); *Potamogeton decipiens*, Nolte; *Cladium Jamaicense*, Crantz (= *C. Mariscus*, R. Br.); *Deschampsia discolor*, R. and S.; *Festuca rubra*, L.

First Records of Scottish Plants.—In the concluding part and the "Additions" to the list of "First Records of British Flowering Plants" compiled by W. A. Clarke, F.L.S. (*Journ. Bot.*, Nov. and Dec.) the following Scottish records are included:—

Poa alpina, L., 1777.—"On the sides of Craigchalleach, above Finlarig, in Breadalbane. Mr. Stuart."—Lightfoot, "Fl. Scot.," i. 96.

P. laxa, Hænke, 1800.—“On Ben Nevis. Mr. Mackay.”—Sm., “Fl. Brit.,” 101 (as *P. flexuosa*).

P. Balfourii, Parnell (in *Ann. Nat. Hist.*, x. 122), 1842.—“Gathered by Dr. Balfour on Ben Voirlich, near the head of Loch Lomond.”

Festuca sylvatica, Vill., 1800.—“In a moist wooded valley at the foot of Ben Lawers, 1793. Mr. Mackay.”—Sm., “Fl. Brit.,” i. 121 (as *F. calamaria*).

Oxytropis uralensis, DC.—“Discovered by Dr. John Walker near Loch Leven in 1761.” See Walker’s “Essays on Nat. Hist. and Rural Economy,” 1808, p. 380.

Lathyrus niger, Wimm., 1821.—“Found by Thomas Dummond in the Den of Airly, 12 miles west of Forfar.”—Hooker, “Fl. Scot.,” ii. p. 267 (as *Orobis niger*).

Saxifraga rivularis, L., 1792.—“In monte Ben Nevis Scotiæ hanc plantam primus in Britannia invenit anno 1790. D. Robertus Tounson.”—J. E. Smith, in Linnæus’s “Fl. Lapponica,” 2nd ed., p. 143.

Salix lapponum, L.—“It appears from the essays of Dr. J. Walker that this was first observed by him in the parish of Moffat in July 1762.

CURRENT LITERATURE.

The Titles and Purport of Papers and Notes relating to Scottish Natural History which have appeared during the Quarter—October-December 1896.

[The Editors desire assistance to enable them to make this Section as complete as possible. Contributions on the lines indicated will be most acceptable and will bear the initials of the Contributor. The Editors will have access to the sources of information undermentioned.]

ZOOLOGY.

MUSEUM NOTES: ON THE NESTING BIRDS OF PERTSHIRE AND THE BASIN OF THE TAY. By the late Col. H. M. Drummond Hay, C.M.Z.S. *Trans. Perthshire Soc. Nat. Sci.*, vol. ii. pt. iv. (1895-96), pp. 143-147.

BIRD LIFE ON RONA’S HILL, SHETLAND. By Robert Godfrey. *The Field*, 26th September 1896, p. 535.

IN THE WILDS OF NORTH ROE, SHETLAND. By Robert Godfrey. *The Field*, 21st November 1896, p. 848.—Refers to the bird life of the district.

HEDGE-SPARROW BREEDING ON THE BASS ROCK. J. A. Harvie-Brown. *Zoologist* (3), vol. xx. p. 358 (September 1896).—A reply to a note by Mr. Meiklejohn in the previous number.

JERFALCON IN SKYE. E. Willoughby. *The Field*, 5th December 1896, p. 906.—Specimen shot at Portree on 28th November.

NIGHT HERON IN SCOTLAND. Boyd Alexander. *The Field*, 21st November 1896, p. 848.—An immature male shot in the neighbourhood of Kilmarnock during the autumn of 1888.

THE TUFTED DUCK IN SCOTLAND: ITS INCREASE AND DISTRIBUTION. By J. A. Harvie-Brown, F.R.S.E., F.Z.S. *Proc. Roy. Phys. Soc. Edin.*, vol. xiii. pt. ii. (1895-96), pp. 144-160.

GREAT SNIPE IN DUMFRIESSHIRE. H. Brooks Broadhurst. *The Field*, 17th October 1896, p. 641.—A specimen weighing $7\frac{1}{2}$ oz. shot on 2nd October at Terregles.

LITTLE GULL ON THE SOLWAY FIRTH. H. A. Macpherson. *Zoologist* (3), vol. xx. p. 385 (October 1896).—Specimen shot on 15th September whilst hovering over the river Esk.

LITTLE AUK IN ABERDEEN. A. J. Kinloch. *The Field*, 31st October 1896.—Specimen seen swimming in the Dee on 22nd October.

LIST OF SOME OF THE PELAGIC OVA, LARVÆ, AND YOUNG FISHES COLLECTED BY THE 'GARLAND' DURING THE LATTER HALF OF 1895. By William Wallace. *14th Ann. Rep. Fish. Board Scot.*, pt. iii. pp. 223-228 (1896).—The regions visited were the Moray Firth, Aberdeen Bay, Montrose, St. Andrews Bay, Firth of Forth, Firth of Clyde, and Shetland.

CAMBERWELL BEAUTY IN FORFARSHIRE IN SEPTEMBER. W. R. Ogilvie Grant. *The Field*, 3rd October 1896, p. 569.—Specimen seen on 12th September at Finavon, Forfarshire; another taken at Portree, Isle of Skye, about the same date; and a third seen at Cromarty at the end of September.

VANESSA ANTIOPA AT SKYE. P. M. Ellis. *The Field*, 19th September 1896, p. 495.—Specimen captured on 10th September, on the slopes of Gurr-na-Gillean.

CÆNONYMPHA TIPPHON VAR. PHILOXENUS IN SCOTLAND. J. W. Tutt. *Ent. Record*, vol. viii. p. 237 (1st November 1896).—A note reminding entomologists of the occurrence of this variety in Kirkcudbrightshire (Cobend).

CATOCALA FRAXINI AND EUVANESSA ANTIOPA AT ABERDEEN. Arthur Horne. *Ent. Record*, vol. viii. p. 310 (15th December 1896).—*C. fraxini* taken at railway station on 14th September; *E. antiopa* in Rubislaw Quarry on the same day.

ACHERONTIA ATROPOS AT CULROSS, N.B. John M'Gregor. *Ent. Mo. Mag.* (2), vol. vii. p. 227 (October 1896).—Specimen captured on 11th September.

ABERRATION OF BOMBYX CALLUNÆ. A. Horne. *Ent. Record*, vol. viii. p. 305 (15th December 1896).—A buff-coloured male reared from a larva found feeding on heather on Hazelhead Moor, near Aberdeen.

CATOCALA FRAXINI IN THE ORKNEYS. Rev. F. W. Walker. *Entomologist*, vol. xxix. p. 368 (December 1896).—Specimen captured between Stromness and Kirkwall on 1st September. See also note by A. Horne, *Ent. Record*, vol. viii. p. 309 (15th December 1896, *ut sup.*).

LOCAL RACES OF HYPSPIPETES SORDIDATA. H. Tunaley. *Ent. Record*, vol. viii. p. 237 (1st November 1896).—A note comparing the forms found at Forres and Aviemore.

ALLOTRICHA PALLICORNIS, EATON, AND OTHER TRICHOPTERA FROM CLYDESDALE. Kenneth J. Morton. *Ent. Mo. Mag.* (2), vol. vii. p. 231 (October 1896).—Twelve species recorded from Uddingston.

REPORT ON A COLLECTION OF MARINE DREDGINGS AND OTHER NATURAL HISTORY MATERIALS MADE ON THE WEST COAST OF SCOTLAND BY THE LATE GEORGE BROOK, F.L.S. By Thomas Scott, F.L.S. *Proc. Roy. Phys. Soc. Edin.*, vol. xiii. part ii. (1895-96), pp. 166-193, pl. v.—This paper records in all about 344 species of Fishes and Marine Invertebrates, including one species of Amphipodous Crustacean new to science.

THE INLAND WATERS OF THE SHETLAND ISLANDS. PART II. By Thomas Scott. *14th Ann. Rep. Fish. Board Scot.*, part iii. pp. 229-243, pl. ix. (1896).—This paper gives the results of the examination during the past year of several lochs on the island of Yell, of one on the island of Unst, of nearly all the lochs on the island of Bressay, and of two on the Mainland. A table is given of the distribution in these lochs of three species of Mollusca, forty-nine of Crustacea, and two of Polyzoa.

THE INVERTEBRATE FAUNA OF THE INLAND WATERS OF SCOTLAND. PART VI. By Thomas Scott, F.L.S. *14th Ann. Rep. Fish. Board Scot.*, part iii. pp. 167-170 (1896).—A table is given showing the species of Mollusca and Crustacea obtained during the past year in Lochs Vennachar, Achray, and Katrine, one of which is an addition to the British fauna.

ADDITIONS TO THE FAUNA OF THE FIRTH OF FORTH. PART VIII. By Thomas Scott, F.L.S. *14th Ann. Rep. Fish. Board Scot.*, part iii. pp. 158-166, pls. iii. and iv. (1896).—Thirty-five species of Crustacea are here added to the Forth fauna, including two species new to science. A note is added also, and figures given on Annelid Parasites of Sagitta.

ON SCOLECITHRIX HIBERNICA, A NEW SPECIES OF COPEPOD, WITH SOME REMARKS ON THE DISTRIBUTION OF THE CRUSTACEA. By Andrew Scott. *Ann. and Mag. Nat. Hist.* (6), vol. xviii. pp. 362-367, pls. xvii. and xviii. (November 1896).—Loch Fyne and the coast of Arran are mentioned as localities for this species.

Euchæta norvegica is stated to occur in Loch Fyne and *Conchoecia elegans* in Loch Etive.

BOTANY.

A REVISED LIST OF THE BRITISH CARYOPHYLLACEÆ, by Fred. N. Williams, F.L.S. (*Journ. Bot.*, October, pp. 423-429), is an effort to bring the nomenclature of British floras into line with that employed in many Continental floras, in which the genera are accepted in much narrower limits. The (rather numerous) alterations in the names given in the ninth edition of the "London Catalogue" are marked with an asterisk.

THE SALIX LISTS IN THE LONDON CATALOGUE, by (Rev.) E. F. Linton, M.A. (*Journ. Bot.*, November, pp. 461-472), discusses fully the treatment of *Salix* by the author and by Dr. F. B. White, giving reasons for the writer's views, and discussing from his present knowledge the origin and rank of hybrids, etc.

LIST OF BRITISH CYPERACEÆ (EXCLUDING *Carex*), by C. B. Clarke, F.R.S. (*Journ. Bot.*, October, pp. 415-417), is valuable as a statement of the views with regard to nomenclature of the recognised authority in Britain on the *Cyperaceæ*. He keeps *Eleocharis* distinct from *Scirpus*, but sinks *Blysmus*; and he falls back on the older name *Cladium jamaicense*, Crantz (1766), for *C. Mariscus*, R. Br.

BARTSIA ODONTITES, VAR. LITTORALIS, REICHB., IN BRITAIN. By Symers M. Macvicar. *Journ. Bot.*, November, p. 479.—Grows in some quantity on shingly shore on west coast of Argyleshire, in v.c. 97.

WEST PERTH PLANTS. By (Rev.) W. Moyle Rogers. *Journ. Bot.*, November, pp. 479-480.—New records for the vice-county are:—*Lycopodium inundatum*, from Ben Ledi; *Polygala oxyptera*, *Hieracium auratum*, Fr., *Lactuca muralis*, *Arctium minus* (seg.), *Betula verrucosa*, all from near Callander; *Polygonum maculatum*, near Lake of Monteith.

THE BOTANY OF AYRSHIRE (BY PARISHES), FROM ORIGINAL INVESTIGATION. By John Smith (of Monkredding, Ayr). (Ardrossan: A. Guthrie and Son, 1896.)—Briefly reviewed by A(rthur) B(ennett) in *Journ. Bot.*, October 1896, pp. 435-436.

ADDITIONS TO THE KNOWN FLORA OF THE SOUTH EBUDES (Islay, in September). By A. Somerville. *Journ. Bot.*, October, p. 433.—About 340 vascular plants were found, 11 being new to the vice-province 102.

FIRST RECORDS OF BRITISH FLOWERING PLANTS. Compiled by William A. Clarke, F.L.S. *Journ. Bot.*, Nov., pp. 472-476, and Dec., pp. 507-510.—Includes from *Arrhenatherum* to end, and additions and corrections.

REVIEWS.

AMONG BRITISH BIRDS IN THEIR NESTING HAUNTS: ILLUSTRATED BY THE CAMERA. By Oswin A. J. Lee. (Edinburgh: David Douglas, 1896.)

A few months ago we noticed in our pages what may be termed the pioneer work on the application of photography to birds' nests and eggs taken *in situ*. We now have the pleasure of noticing a much more ambitious and important work devoted to the same subject: one which at once carries this branch of ornithological work to its highest place, both as regards the beauty and size of its plates, and the intention of making it a complete pictorial history of the nests of all the birds that breed in the British Islands, as seen in their natural surroundings.

The two parts issued each contain ten fine facsimile plates depicting the nesting habits of the Eider Duck (2), Cormorant, Peregrine (2), Long-eared Owl, Sparrow-hawk, Lesser Black-backed Gull (2), Roseate Tern, Coot (2), Waterhen (2), Shoveller, Willow Warbler, Kittiwake, Sandwich Tern, and Sheld Duck (2). All of them are most satisfactory and pleasing, and we may at once say that they are as near perfection as it is perhaps possible to make them. Mr. Lee has evidently spent much time and enthusiasm in the procuration of his pictures, many of which must have been procured under great difficulties not to say danger.

We are not sure that much letterpress is necessary as an adjunct to such a work. Mr. Lee, however, has not only supplied the necessary data relating directly to his plates, but he has also given a considerable amount of general information relating to each species, and has added his own experience concerning them. This section of the work is illustrated by a series of sketches of some merit devoted to the birds and their haunts.

There are one or two statements in the text to which attention may be drawn. Chief among these is the one that the camera indicates that the Sandwich Tern makes two beats of its pinions in the twentieth part of a second, that is 40 strokes per second, or 2400 per minute! This is a most startling statement, and one that must be received with considerable doubt, since Mr. Lucas estimates the wing vibrations of the Humming Birds—a family in which these movements probably reach their maximum—at something under 500 per minute. Other items worthy of notice, and requiring confirmation, relate to the breeding—somewhat commonly too—of the Hooded Crow in Peeblesshire, as related in the account of the Long-eared Owl; and the nesting of the Kittiwake in recent years at St. Abb's Head.

Great credit is due to Mr. Douglas for the really excellent manner in which he has accomplished his share of the production. It is admirable in all respects, and leaves nothing to be desired.

The work is being issued in monthly quarto parts at 10s. 6d. Each part contains ten plates; and it is probable that eighteen or twenty-two parts will complete the work.

THE CAMBRIDGE NATURAL HISTORY. Edited by S. F. Harmer, M.A., and A. E. Shipley, M.A. Vol. II.—WORMS, ROTIFERS, AND POLYZOA. (London: Macmillan and Co., Ltd., 1896.)

"The Cambridge Natural History" is making satisfactory progress, since three important volumes have been issued in less than two years.

The volume under notice is the third issued, and it is equal to its precursors, which have been favourably noticed in our pages, in the excellence of treatment, scientific accuracy, and in its *original* illustrations, of which there are 227 in the text.

It treats of the following important, and in some cases difficult, groups of invertebrates, chiefly by authors who are well known and have made them a special study:—Flat-worms and Mesozoa, by F. W. Gamble; Nemertines, by Miss L. Sheldon; Thread-worms and Sagitta, by A. E. Shipley, M.A.; Rotifers, by Marcus Hartog, M.A., D.Sc.; Polychaet Worms, by W. Blaxland Benham, D.Sc., M.A.; Earthworms and Leeches, by F. E. Beddard, M.A., F.R.S.; Gephyrea and Phoronis, by A. E. Shipley, M.A.; and Polyzoa, by S. F. Harmer, M.A.

There is only one fault to find with this volume, namely, the want of a *general introduction* to the difficult groups treated of in its pages. True, there is a tabulated "Scheme of Classification," but this is not sufficient, and fails to convey an adequate idea of the relationships and value of the different groups.

We have pleasure in recommending the volume to those who desire to have the best scientific work on the Worms, Rotifers, and Polyzoa. Judging from the quality of the volumes issued, there is no room for doubt that the Cambridge Natural History is destined to become *facile princeps* among the Natural Histories, past and present, written in our language.

LIFE IN PONDS AND STREAMS. By W. Furneaux, F.R.G.S. With 8 Coloured Plates and numerous illustrations in the text. (London: Longmans, Green, and Co., 1896.) Price 12s. 6d.

This is the fourth volume of the popular "Out-door World Library." It is a handsome and prettily illustrated volume; is attractively written; and contains a great amount of useful and accurate information regarding the numerous, very varied, and interesting forms to be found in the ponds and streams of the British Islands.

We have chapters devoted to Introductory matters; Collecting in Ponds and Streams; the Use of the Microscope; Preservation of Objects; Aquaria and their Management; the Lower Forms of Pond Life; Worms, Leeches and their Allies; Freshwater Mollusca; Fresh-water Crustaceans and Spiders; Aquatic Insects; Fish for the

Aquarium; Amphibians. The subject matter relating to the multitude of creatures treated of has been carefully and judiciously selected; while the instructions for collecting and preserving are eminently practical.

As a book for young naturalists, it is unrivalled on the subjects to which it is devoted, and worthy of being well recommended.

A CONCISE HANDBOOK OF BRITISH BIRDS. By H. Kirke Swann. (London: John Wheldon and Co.)

Of the making of books on British Birds there appears at present to be no end. Among them Mr. Kirke Swann's Handbook may claim as its *raison d'être* that there is still room for a handy book at a moderate price, which can be carried conveniently in the pocket, for use in the field or in the museum. In some respects the book before us meets this want. The type is clear, and, so far as its form, size, and binding are concerned, it leaves nothing to be desired; but its claim to be a "handy text-book for reference" will be open to dispute until it is provided with an alphabetical index. Unfortunately, in the work itself there is a lack of proportion; two or three species having as many pages assigned to them in the first part, while towards the end ten or eleven species are crowded into the same space, and some species are inadequately described. The information given regarding the distribution of birds in Scotland is frequently misleading and erroneous. The Stock Dove is stated to be locally distributed as far as South Scotland. This is an understatement, while that Wigeon breed throughout the Highlands is at once too much and too little. The Buzzard extends north to the Inner Hebrides according to Mr. Kirke Swann, but it is well enough known in West Ross. The Gray Crow does not breed throughout Scotland—it is rare between Clyde and Solway in summer. The Marsh Tit, readers of this journal will be surprised to learn, only breeds in the South of Scotland. The Jay is "rather common and generally distributed, except in extreme north of Scotland." As a matter of fact, there are counties in the south of Scotland where it has perhaps never been anything but a straggler, and in others it is now quite extirpated, although formerly abundant. These are only a few examples of inaccuracies regarding Scottish Distribution, but the book has no defect that cannot be remedied in another edition, in which we hope it will be thoroughly revised and justly proportioned.—J. P.

BRITISH BUTTERFLIES. By J. W. Tutt, F.E.S. (London: George Gill and Sons, 1896.)

This is a capital book, of a handy size, handsomely got up, and wonderfully cheap. For the remarkably low sum of five shillings the collector of butterflies may here obtain an excellent account of our native species, with descriptions of all the varieties, and of the egg,

larva, pupa, and imago of the typical forms. In addition is given a carefully prepared account of the habitat and distribution of each species, with its time of appearance; while at the end of each chapter we find a most useful table showing at a glance the months in which the collector should meet with each of the four stages of any species, its reputed food-plants, and its place of pupation. This is perhaps one of the best features of the book, and should save the youthful enthusiast a great deal of trouble in searching for the facts he requires concerning the life-history of any of his favourite creatures. At the end of the volume is a series of nine photographic plates (the first is used as a frontispiece) showing the imagos of all the species, while in the body of the work is a tenth plate showing the structure and mode of attachment of butterfly pupæ.

GILL'S PRACTICAL OBJECT LESSON SERIES. PART II.—INSECTS AND SPIDERS. By J. W. Tutt, F.E.S. (London: George Gill and Sons, 1896.)

This little book consists of a series of fifteen lessons supplying, for the use of teachers, an outline of the principal points in the anatomy and physiology of insects, and upon the whole they have been carefully compiled. A very awkward blunder has been made, however, in Lesson V., where in the text the author is talking about locusts (family *Acridiidae*). He states correctly in two places (pp. 47 and 49) that the female is not provided with an ovipositor, and then immediately refers to Plate VI. Fig. 1, which is a representation of one of the *Locustidæ*, calling the long ovipositor there shown a *digging organ*! This is very misleading, and when we find a statement on p. 84 that flies have two ocelli we cannot help feeling that the book must have been written in a hurry. In the first part of Lesson X. it might have saved confusion if it had been stated that the House Fly was the creature described, as many of the statements made cannot otherwise be accepted. It is a pity that such a useful little book is marred by these inaccuracies, but a second edition may afford an opportunity to correct them.

RULES FOR REGULATING NOMENCLATURE IN ENTOMOLOGICAL WORK. Compiled by Lord Walsingham and John Hartley Durrant. (London: Longmans, Green, and Co., 1896.)

This is a set of rules, fifty-one in number, prepared with a view to securing a strict application to the law of priority, and entomologists will be grateful to the authors for preparing such a guide. Some uniform method of dealing with the vexed question of nomenclature is much needed, and the present contribution is full of useful suggestions. Prepared by such authorities, and with so much care, its value is manifest.

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THE WILD CAT OF SCOTLAND.

By EDWARD HAMILTON, M.D., F.L.S., F.Z.S.

THE history of the Wild Cat of Scotland must be in a great measure conjectural. As far as I can judge from my own observations and researches, which have extended over a period of upwards of thirty years, as well as from the observations of others, I find but very few facts which can be entirely relied on, and the few there are are mixed up with a great many fallacies.

It would seem that the original Wild Cat, as found in early historical times as well as in the Middle Ages, has for a long time been quite extinct in this country, its place being taken in the first instance by a mixed breed, in which the hereditary strain of the original wild race predominated. Later on, as the imported domestic race increased in numbers and localities, this was superseded by a still more modified form of feral cat, in which the foreign characteristics of the ancestral progenitors of the domestic race, viz. the African cat, were in the ascendant, and prevail up to the present time.

The only evidence of the existence of the Wild Cat in Scotland in prehistoric times rests on the discovery of some osseous remains in the shell marl deposits at the bottom of five or six small lochs in Forfarshire intermingled with the

bones of other animals, which the late Sir Charles Lyell ("Principles of Geology," vol. iii. p. 326, 6th ed.) arranges in the following order, according to their abundance. He begins with those of the red deer (*Cervus elaphus*) as most numerous, and then follow those of the ox, the bear, the horse, the sheep, the dog, the hare, the fox, the wolf, and lastly the cat. These marl deposits are comparatively of recent date, and the bones brought to light are all of animals now existing, or which have become extinct by human agency, as the bear and the wolf.¹

A long period of geological time must have elapsed between the Pleistocene deposits of brick-earth and gravel, in which the bones of the Wild Cat have been found in England intermingled with the osseous remains of the great cave bear, cave lion, cave hyena, and other extinct mammals, and the marl deposits in which we find the Wild Cat of Scotland. Not a single bone of any carnivore, recent or extinct, has been discovered in any of the earlier geological formations, and not even, as far as I am aware, in any of the great peat-bogs or morasses. Professor J. Geikie ("The Great Ice Age," p. 347) says that nowhere in the recent deposits in Scotland have we any trace of the great pachyderms so frequently met with in certain river gravels of England and the Continent; and Professor Boyd Dawkins, British Post-Glacial Mammals ("Quarterly Journal of the Geological Society," vol. xxv., 1869), states that he "knows of no evidence that post-glacial mammals ever existed in Scotland, with the exception of three remains of the mammoth and two of the reindeer. Remains of other animals, such as the urus, red-deer, and the like, have been obtained from marl beds underlying the peat, or from alluvials which are prehistoric but not post-glacial."

Scotland, says Sir Charles Lyell ("Antiquity of Man," p. 274), "was submerged 2000 feet, and other parts of the British Isles 1300 feet. The Scotch Lowlands would therefore emerge from the glacial wave long after the middle and southern

¹ I have been unable to trace the present whereabouts of these bones. On my applying to Sir Leonard Lyell, he answered: "I certainly do not remember having seen any fossil bones of the cat from the marl. There are only a few skulls and antlers of deer and ox remaining. These are in a most friable condition, and I had much difficulty in preserving them."

parts of Britain had been occupied by post-glacial mammals, even if the rate of elevation was equal over the whole British area"; and he tells us that "the close of the glacial period in Scotland probably coincided with the existence of man in those parts of Europe where the climate was less severe, and notably in the basins of the Thames and the Somme, in which bones of many extinct animals are deposited with flint instruments of the antique type." Amongst these extinct animals are the fossil bones of a cat, which, as Sir Richard Owen remarks, are "undistinguishable from the analogous parts of the still existing species of Wild Cat."

The Wild Cat was probably an inhabitant of Southern and Middle Britain for a long period previous to its appearance in Scotland, when, by the termination of the Great Ice Age, the climate of these northern regions had been sufficiently modified to allow of the existence of animal and vegetable life.

What were the obstacles which prevented its migration into Scotland?

Before the last upheaval of the land, when the Lowlands were emerging from the great Glacial Sea, an arm of that sea extended from the Firth of Clyde to the Firth of Forth, completely separating the northern from the southern portion; and Sir Charles Lyell (*"Antiquity of Man,"* pp. 52-55) tells us that this state continued long after the advent of man in those parts. Skeletons of whales and other marine animals have been found in the loamy and peaty beds in the Carse of Stirling, and near them pointed implements made of deer's horns. The position of these fossil whales and bone implements shows, says Lyell, that the upheaval by which the raised beach at Leith was laid dry extended westward as far as the Clyde, where marine strata containing buried canoes have been discovered." This same upward movement reached simultaneously east and west, and as far north as the estuary of the Tay, and a similar movement occurred much farther south, on the estuary of the Solway Firth. Wallace (*"Geographical Distribution of Animals,"* vol. i. pp. 12, 13) points out that arms of the sea are barriers to mammal migration. Very few mammals, he writes, can swim over any considerable extent of sea, though many can swim well

for a short distance. He considers that in most cases a channel ten miles in width would prove an effective barrier to most mammals. This would certainly be the case as to most of the smaller species of cats, as well as to those animals upon which their existence depended. The lemmings, for instance, described by Wallace as migrating in their hundreds of thousands, cross rivers and lakes with impunity, but nearly all perish from the salt water if they attempt to cross an arm of the sea.

Assuming that these wide estuaries and arms of the sea were the chief obstacles to migration, the next point for consideration is: When were they sufficiently obliterated to allow of a free and safe passage? According to Sir Charles Lyell ("Antiquity of Man," p. 55), the conversion of the sea into land has always been considered by antiquaries to have been caused by the silting up of the estuaries, both in respect to the Solway and the Forth. "Thus Horsley insists on the difficulty of explaining the position of certain Roman stations on the Solway, the Forth, and the Clyde, without assuming that the sea had been excluded from certain areas which it had formerly occupied." Lyell goes on to say that, "on a review of the whole evidence, geological and archæological, afforded by the Scottish coast-line, we may conclude that the last upheaval of twenty-five feet took place, not only since the first human population settled in the island, but long after metallic implements had come into use; and there seems even a strong presumption in favour of the opinion that the date of elevation may have been subsequent to the Roman period." But this rise of twenty-five feet was only the last stage of a long antecedent process of elevation; and during that earlier period the Wild Cat and the smaller rodents had probably the means of migrating afforded to them by the drying up of some portion of these estuaries.

As the bones of the cat have only been found in the latest deposits of the Quaternary series, namely in the shell marl deposits of some of the Forfarshire lakes, which have been drained in order to use the marl for agricultural purposes, under what circumstances did these bones get there?

Lyell remarks that these marls often consist entirely of an aggregate of shells of the genera *Limnæa*, *Planorbis*,

Valvata, and Cyclas, all at present existing in Scotland. A considerable portion appear to have died young, few attaining a state of maturity, and many are entirely decomposed. In or on these deposits are found the osseous remains of animals, as previously stated. According to the same authority, these bones could not have been embedded by the action of rivers or floods; and the expanse of water was originally so confined that the smallest animals could have crossed by swimming from shore to shore. Deer, and such species as take readily to the water, may have been mired when landing where the bottom was soft and quaggy; other species, Lyell supposes, may have fallen in when crossing the frozen surface, and this may account for the scarcity of the bones of the Wild Cat. At any rate, some were there to testify that it had migrated as far north as Forfarshire in very early pre-historic times, and would gradually extend its range throughout the country as the means of its existence increased.

The late Edward Alston, in his introduction to the fauna of Scotland, says "that the absence of the known fossil fauna of Scotland and Ireland, and of most of the characteristic post-Pliocene English animals, shows that the northern migration of these forms was slow, and gradually advancing as the glacial conditions of the northern parts of our island decreased in intensity. Thus it is not difficult to suppose that the hedgehog, ermine, badger, squirrel, and mountain hare may have found their way into Ireland from southern Scotland long before they were able to penetrate into the sub-arctic regions of the Highlands, which they did not accomplish until a further improvement in the climate had taken place."

In historic times there is no allusion to the Wild Cat in Scotland until the early part of the sixteenth century, although in England this animal is often mentioned in old documents of the twelfth and thirteenth centuries, either as a beast of the chase or as vermin. In Sir Robert Lindsay's "Chronicles of Scotland" (vol. ii. p. 348), published in 1528, there is an account of a great hunt and entertainment given by the Earl of Athol to James V., in which a great number of all sorts were killed, and among them certain "small beastes such as roe, woulffs, foxes, and wyld cattis." And, a century

later, Sir Robert Gordon, in his genealogy of the Earls of Sutherland, dated from Dornough, the 3rd day of December 1630, observes that "all the forests and schaces of that country are full of Reeddeir and Roes, Woulfs, Foxes, Wyld Cattis, Brocks, Skyrrells, Whittretts, Weasels, Otters, Martrixes, Hares, and Fumarts."

The first description of the Wild Cat of Scotland is given by Sir Robert Sibbald, who published his "*Scotia Illustrata, sive Prodrromus historiæ naturalis*" in 1684, where he mentions it as *Felis sylvestris*. He says: "*Felis sylvestris major est domestica, densiore et longiore pilo, colore fusco, variato, cauda crassiore. Aviculis vescitur, Lepusculis,*" etc. The Domestic Cat he describes as "*Felis animal familiare ac domesticum, Leoni non dissimile, facie ac dentibus et unguibus. In tenebris illi fulgent radiantque Oculi.*"

Sir Robert Sibbald was His Majesty's physician and geographer. He cautions people against allowing cats to be near children, especially infants, and says: "*Feles infantibus exitiales quandoque sunt; ipsorum enim ori toto corpore incumbentes fuliginis exitum et Thoracis motum intercipiunt, pestiferâque, quam exhalant, aura tenellorum Infantium spiritus inficiunt, eosque præfocant.*" He also affirms that certain parts of the Wild Cat are very useful as medicines: "*Cati sylvestris Axungia calefacit, emollit, discutit. Ad contracturas et Articulorum affectus reponitur. Pellis mollis et pinguiuscula paratur à Pellionibus ad calefaciendum Ventericulum frigidum appetitumque excitandum, instar scuti stomachici. Arthritici Articulis imponunt.*"

In 1790 Sir R. Sinclair began his Statistical Account of Scotland, the reports of each parish and county being, for the most part, written by the clergymen of the district, and depending on the knowledge which they acquired from others on particular subjects, especially on natural history. The Wild Cat is mentioned as found in the counties of Angus, Caithness, Dumbarton, Dumfries, Inverness, Kirkcudbright, Nairn, Perth, Ross and Cromarty, Roxburgh, Stirling, and Sutherland. In most of the remaining counties the natural history report generally ran thus: "The wild animals of the district are much the same as in the other parts of the Highlands." The New Statistical Survey was commenced

about 1832-33, and published in 1845, and it is interesting to note the changes which had taken place in the years intervening after Sir R. Sinclair's account. It is found, for example, that in Dumfriesshire in 1791 (Old Statistical Account, vol. i. p. 61), in the parish of Kirkmichael, the wild quadrupeds reported are foxes, otters, badgers, hares, polecats, wild cats, ermines, and weasels; and at Ballantrae in Ayrshire are hares, foxes, rabbits, polecats, and wild cats. In the New Statistical Account the report for Ayrshire says: "From the names Wild Cat Road, Cats Craig, etc., the native cat would seem at some time to have been a common inhabitant of the neighbourhood; but the race is probably now exterminated," while in Dumfriesshire there is no mention of a single Wild Cat having been seen. Again, in Roxburghshire, the Rev. J. Arkle reports, in 1795, that the wild quadrupeds are foxes, wild cats, polecats, wheazles, and white wheazles. In the New Statistical Account no mention is made of the Wild Cat. At times, however, the reverse is the case; and, while the Wild Cat is absent from the old statistics in certain parts of the Highlands, the new accounts testify to its existence. In most of the reports, both old and new, it is mentioned as destructive to game but not to lambs; but the Rev. Charles Hardy reports, in 1792, that in the parishes of Crathie and Braemar, in Aberdeenshire, the depredations of wild animals, including the Wild Cat, on game, sheep, and poultry were so great that the value of sheep and lambs in these and other neighbouring parishes annually killed by vermin equalled half the rent paid by the proprietors. Mr. Farquharson formed a scheme for the more complete destruction of these destroyers. During the time this scheme was in operation, a period of about ten years, there were killed in those parishes 634 foxes, 44 wild cats, 157 polecats, 70 eagles, 2920 hawks and kites, 1347 ravens and crows, besides those which died from poison or wounds.

Selby also ("Quadrupeds and Birds of the County of Sutherland"), writing in 1835, says that the Wild or Mountain Cats in Assynt commit great ravages among the young lambs.

Harvie-Brown, who has written more about the Wild

Cat of Scotland than any other naturalist, says, in his "Past and Present Distribution of some of the Rarer Animals in Scotland" ("Zoologist," 1881), that this animal is rapidly becoming extinct; and he agrees with the late Edward Alston as to its complete extermination in the Lowlands, although it may still be found in some of the wilder districts of the extreme north.

But was this Wild Cat, which in 1881 had become nearly extinct in many parts of Scotland, a true species, descended from that native cat, the remains of which have been found in the marl deposits existing in early historic days, or was it the offspring of a mixed race resulting from the interbreeding of the original wild race with the imported domestic cat?

Most authors who have written on the natural history of this animal state that there are certain well-known characteristics which distinguish it from the domestic variety. It has been found, however, that, on examining a number of specimens of both races, these so-called specific characteristics are as often found in the tabby forms of *Felis catus domestica* as in the *Felis catus ferus*, and cannot be considered as representative, but are caused by the interbreeding of the two races for a long series of years.

We have no direct record as to when the domestic cat was first introduced into Scotland. Possibly the Romans brought it over with them, for we know that it was imported into Italy from Egypt some five hundred years before the Christian era, and, though distributed throughout the provinces, was not common among the Romans themselves till the middle of the first century A.D.

The Romans under Cæsar invaded Britain in the year 55 B.C., and, before the lapse of a hundred years, had reduced it to a Roman province, with frequent and regular intercourse with Rome. We find, moreover, that towards the end of the second century A.D. the Lowlands of Scotland, even up to the great Caledonian Forest, had been covered with an extraordinary number of towns and stations, and for many years the process of Romanising and civilising went on without interruption, except for the occasional inroads of the far northern tribes, the Caledonii and the

Mœataë. It was against these that Antoninus Pius built his famous wall, the remains of which are now known as Graham's Dyke. The Romans had at that time introduced most of the luxuries which always accompanied their legions, and with them, it may be supposed, the domestic cat. This is indeed but a supposition, but there is a certain amount of corroboration of the very early introduction of the domestic species into the country, and notably the discovery by the Rev. Dr. Joass, at Golspie in Sutherlandshire, of a part of a jaw (the left mandible) of a cat, which, from its size, etc., closely resembles the domestic race, in those curious ancient habitations called Brochs. Although this is not at all conclusive, there is a probability that the domestic cat was known in Scotland in the early historical period, and previous to the final evacuation of the Romans in 436 A.D. Should this conjecture be correct, we have a period of nearly 1500 years for the two closely allied forms to interbreed with each other; and, from the known propensities of both races to wander, especially during the season period, promiscuous intercourse would be the rule and not the exception, for this has been found to be the case wherever the two races coexist. Darwin ("Animals and Plants under Domestication") gives numerous instances, and Sir W. Jardine ("Nat. Libr.," vol. ii. p. 243) notes several cases of the same in the north of Scotland, the so-called hybrids being undistinguishable from the Wild Cat. Mr. Layard ("Catalogue of South African Museum") says that the domestic cats of South Africa breed freely with the wild cats, and that their offspring are fertile; and Mr. Walter Elliott also shows ("Journ. Asiatic Society") that the *Felis catus* interbreeds with the domestic cat. Moreover, M. Gyon, a surgeon in the Algerian army, quoted by M. Isidore Geoffroy St. Hilaire, notes that the domestic cat breeds with the wild cat, and adds that in these mixed unions the female is, as a rule, of the domestic variety. Many other instances could be mentioned, but one rather more interesting than usual may be given in concluding the remarks on this part of the subject. Mr. Harrison Weir, in "Cats and all about them," says that Lord Hope-toun exhibited at the Crystal Palace show some hybrid kittens, the father of which was a long-haired cat, and the

mother a sandy-coloured cat by a Wild Cat out of a long-haired tabby, which he maintains proves, if proof were wanting, that hybrids breed freely either with hybrids or with the domestic or the Wild Cat.

It is a well-known fact that the offspring of domestic cats which have taken to a feral life assume the uniform gray colour of the wild race. Mr. Wallace ("Natural Selection," p. 40) says that domestic varieties of animals which have taken to a wild life must return to something like the original colour of the wild stock or become extinct; and to this opinion Darwin adds that feral cats, *i.e.* cats run wild, both in Europe and elsewhere, are striped and grow to an unusual size, that in La Plata breeds which have been imported soon disappear, and that from their nocturnal and rambling habits free crossing cannot be prevented. Dieffenbach observes, in his "Travels in New Zealand," quoted by Darwin, that in that country, where none but domestic cats had been imported, all those which had run wild had assumed a streaky gray colour; and, according to Sir W. Jardine, "there is no animal that so soon loses its cultivation, and returns apparently to a state completely wild, as the domestic cat." Charles St. John, a close observer, has noticed in his "Natural History of Morayshire" that domestic cats of a gray or tabby colour are more inclined than others to take to the woods; and he remarks that, whatever may have been the colour of the parents, those bred out of them are almost invariably of the brindled gray colour of the Wild Cat.

These feral cats are generally considered, by those who have not studied the matter, to be examples of the genuine Wild Cat of Scotland. In some districts, and especially where rabbits abound, they are becoming very prevalent. I have lately, through the kindness of Mr. Bisshopp, the well-known taxidermist of Oban, examined no fewer than seventeen skins (besides examples which have been set up) of these reputed Wild Cats, killed in the counties of Argyle, Inverness, and Ross, in the years 1895 and 1896. With the exception of two, which showed traces of the early mixed breed, these skins were undoubtedly those of feral cats, the offspring of domestic cats which had taken to a wild life—real vermin,

and arrant poachers, to be placed in the same category as the polecat and the stoat, and very far removed from the original native cat.

At the present time, after so many hundred years of the interbreeding of the two races, it is very difficult to determine the difference between these feral cats and the *Felis catus* as it existed in mediæval times. As far as my observations go, the chief distinctions are the form of the skull, and the general colour and markings of the fur.

1. In the true Wild Cat of earlier days, the skull is long and narrow. The frontal bones are narrow, depressed, and concave in the centre. The cranium is compressed and elongated. The occipital ridge is jagged and thick. The sagittal ridge, extending sometimes as far as the coronal suture, generally about half way. All the bones of the skull are thick and firmly welded together. The basal length is from 85 to 90 mm., and the breadth over parietals is 44 to 47 mm. See Fig. No. 1.

In the feral or Wild Cat of the present day in Scotland, the skull is short and broad, the cranium round and bulging. The frontal bones are broad, convex, or flat. The occipital ridge is thin and less jagged. The sagittal ridge is short or altogether absent. The bones of the skull are comparatively thin and less firm than in the true Wild Cat. The basal length is 78 to 84 mm., and the breadth over parietals 47 to 53 mm. See Fig. No. 2.

In the skull of the African cat (*F. maniculata*), Fig. 4, the frontal bones and cranium approximate to the same parts in Fig. 1, while the same parts in the skull of the domestic cat, Fig. 3, come nearer to those bones in Fig. 2.

2. Although very little reliance can be placed on the distinctions of external appearance and colour, all the earlier writers on the subject (Gesner excepted) state that the colour of the fur of the Wild Cat is of a uniform gray brown. But the examination of a number of examples of the reputed Wild Cat of Scotland, both in the flesh and set up, as also of the dry skins, shows that a large portion have patches of white fur, more or less, on the throat, chest, and anterior part of the abdomen. The chin and muzzle are also white. This white colour, I have every reason to believe, is the re-

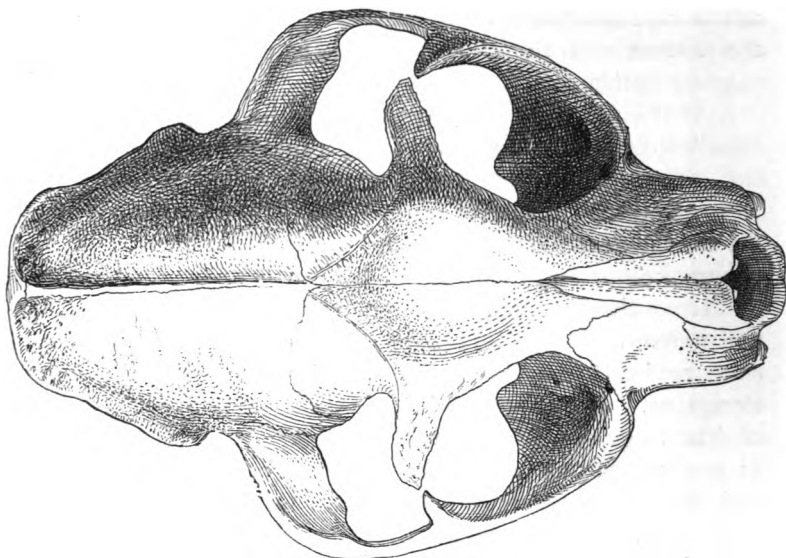


FIG. 1.—Skull of Wild Cat, *Felis sylvestris*.

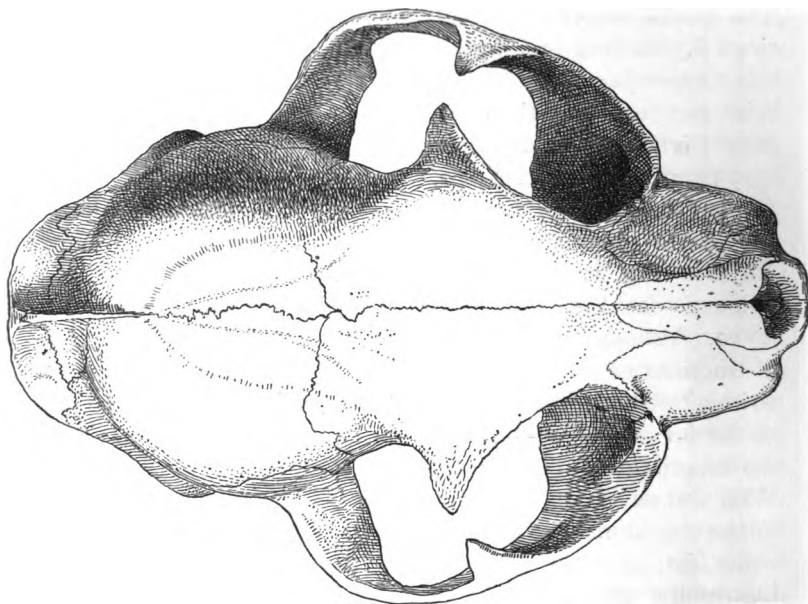


FIG. 2.—Skull of Wild Cat, mixed breed, *Felis catus ferus*.

sult of the interbreeding of the two races. It is now generally conceded that the ancestor of the domestic cat is the

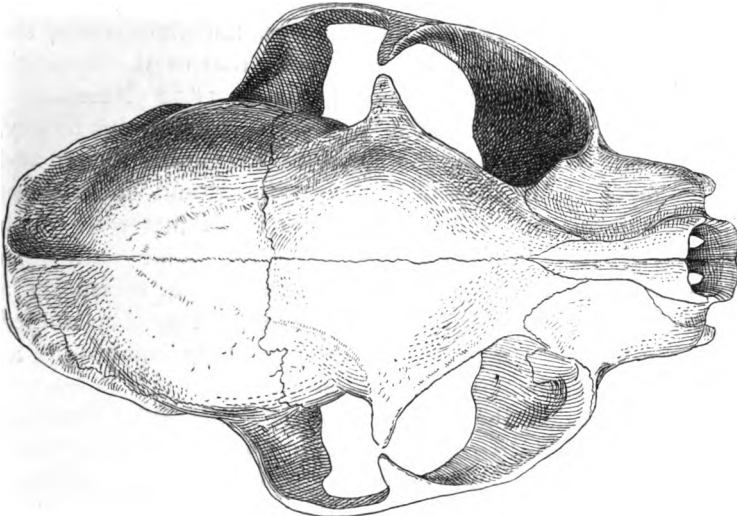


FIG. 3.—Skull of Domestic Cat.

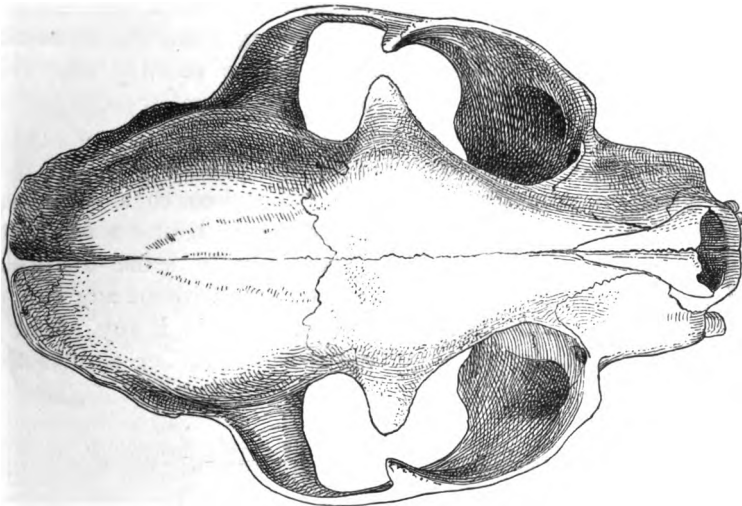


FIG. 4.—Skull of African Cat, *F. maniculata*.

Egyptian (*Felis maniculata*), which has the muzzle, throat, chest, and abdomen of an almost pure white.

As previously stated, most of the external characteristics usually considered as specific to the Wild Cat are common to the domestic species, especially to the tabby variety. Particular stress is laid on the shortness and thickness of the tail of the Wild Cat, as differing from that of the domestic cat, notwithstanding that Macgillivray, in 1838 (Naturalist's Library, vol. vii., "Mammalia"), drew attention to this fallacy. He says: "The tail of the domestic cat seems longer and more tapering because the fur is thinner and shorter, but individuals of the domestic cat are at times met with which exhibit scarcely any difference from the Wild Cat." In respect to this apparent shortness of the tail, in measuring a number of the tails of both races, I found that they ranged between 11 and $14\frac{1}{2}$ inches, the longer length being quite as often found in the Wild Cats as in the domestic.¹

In conclusion, the history of the Scottish Wild Cat may be divided into two periods: the first commencing with the prehistoric cat, as found in the marl beds of Forfarshire, continuing on through early historic times, not only previous to, but long after, the introduction of the domestic cat, as the *Felis sylvestris* of the earlier writers and of the Middle Ages; and the second period beginning when the domestic cat had become more diffused over the country and the interbreeding of the two races more general, producing a mixed breed, the *Felis catus ferus* of authors, now quite extinct. This again interbred with a pseudo wild cat, the offspring of domestic cats which had taken to a wild life, now an extremely rare animal. But there is also a feral cat now existing and becoming, especially in some districts, common—the offspring of domestic cats without any strain of the original native cat, and with very little, if any, affinity to the *Felis catus ferus* of the seventeenth or eighteenth centuries.

¹ The length of the small intestines, and the periods of gestation, are often supposed to be specific characteristics. I have entered fully into these in my "Wild Cat of Europe," pp. 70, 74.

A LIST OF THE BIRDS OF BERWICK-ON-TWEED,
WITH SPECIAL REFERENCE TO "THE BIRDS
OF BERWICKSHIRE," AND NOTICES OF THE
OCCURRENCE OF SOME OF THE RARER
SPECIES IN THE ADJOINING DISTRICTS.

By GEORGE BOLAM, F.Z.S., etc.

(Continued from p. 14.)

JACKDAW, *Corvus monedula*, Linnæus.—Very abundant, nesting in large colonies in the sea cliffs, at Marshall Meadows, and northwards. Numbers of them come to roost regularly with the Rooks at Castle Hills; and in the early morning they may constantly be met with in the streets of the town, picking up any refuse that is to be found.

Individuals with a few white feathers are frequently noticed, and the gray upon the nape is sometimes extended to the margins of the feathers of the back, and even to the shoulders of the wings.

RAVEN, *Corvus corax*, Linnæus.—Sixteen or seventeen years ago I used to see a Raven, or a pair of them, occasionally along the sea banks, between Berwick and Marshall Meadows, and as these sometimes occurred in the breeding season, they would no doubt be nesting at no great distance. Since that time, however, it seems to have been almost banished from the Berwickshire coast.

There is an old nest, in a sheltered corner of the cliff, at Blakey, near Burnmouth, but the fishermen tell me it has not been tenanted for over twenty years. Viewed through a telescope, from the heights above, it is difficult to believe that the nest can be so old, for the sticks are quite fresh and clean looking at that distance, but as it is several years now since it was first pointed out to me, and during that time I have noticed no change in it, the story begins to seem not so improbable after all.

In September 1892 a shepherd, whom we met near Fast Castle, told us that the Raven "had got very uncommon there now," but that a pair had nested, two years previously, on a scar, about half a mile north of the Castle.

In September 1880 one was observed to frequent Lamberton Moor for a short time. In July 1895 the lighthouse-keepers informed us that they had noticed a single Raven at St. Abb's Head, one day during the previous winter, but had seen no others for some time past. On 17th March 1895 a solitary bird flew past me, on the sea banks, near Berwick, going in a northerly direction. These dates supplement the information given by Mr. Muirhead.

In Northumberland, I am glad to say, this fine bird still maintains a footing, and nests in two or three localities, amongst the Cheviot Hills. The eggs are usually laid in March.

CARRION CROW, *Corvus corone*, Linnæus.—Rather plentiful about Berwick, several pairs breeding regularly on the trees about New Water Haugh, and at Castle Hills, and also upon the cliffs along the coast. It is also numerous in the surrounding districts, especially on the south side, the absence of the gamekeeper favouring its existence in many places.

The eggs are laid towards the middle of April, and, even in wooded localities, the nest is sometimes built in a high hedge.

HOODED CROW, *Corvus cornix*, Linnæus.—Common during the winter months, arriving in October, the 7th of that month being the average date on which they have been first noticed here, during the last nineteen years. The 27th September 1879 is the earliest record during that period, when about a dozen birds were seen flying together over Berwick, from the direction of the sea, no doubt just arriving.

In the spring, they are late in returning to their summer quarters, and have frequently been noticed here, on migration, in April, up to the 20th, and even later. Between four and five o'clock, on the morning of 9th April 1895, a number passed over my head at Newton-by-the-Sea, flying due north, and at a height of about a hundred yards. Nineteen were counted together in one party, and several pairs and single birds. One pair descended to a field close by, and remained there half an hour, after which they were noticed to mount in the air again and resume their journey. In the autumn mornings, I have frequently observed the arrival of parties of forty or fifty together; they usually come in from the sea, at a goodish height, in loose straggling order, like Rooks, and hold straight on inland, without attempting to stop here.

I have already recorded ("Hist. Berw. Nat. Club," vol. x. p. 391, etc.) the interbreeding of the "Hoodie" with the Carrion Crow, upon the cliffs near Berwick, and need only say here that this has been observed to take place in 1877, 1878, 1879, 1880, 1881, 1882, and 1886.

In 1892 a pair, of which one was black and the other a hoodie, frequented the cliffs, a little to the north of Burnmouth, and no doubt bred there; and during the summer of 1895, a pair nested near the same place, of which one appeared to be black, while the other was intermediate, in coloration, between the two forms. It is curious to note, that the above is almost the only instance in which I have noticed one of these "half-castes" to be breeding here, in nearly every other case the parent birds having belonged to one or other of the orthodox forms.

ROOK, *Corvus frugilegus*, Linnæus.—Abundant at all seasons, there being three considerable rookeries within the borough—Castle Hills, Sanson Seal, and Marshall Meadows.

White or pied varieties are not unfrequently met with amongst the young birds, various shades of brown and grey also occurring; more rarely the feathers are barred, or spotted, with one or other of these colours, suggesting, as has been supposed, an approach to the spotted nest-plumage so common amongst the *Passeres*. All these varieties have occurred in the district, our museum containing one or more specimens of each.

GREAT GREY SHRIKE, *Lanius excubitor*, Linnæus.—Rather an uncertain winter visitant, appearing in some seasons in considerable numbers, and not again perhaps for several years. The following have occurred in the borough, within recent years :—

One shot at Spittal, 25th November 1882.

One seen near Ord Cottage, December 1886.

One picked up upon the railway near the town on 9th April 1889.

One seen in a garden near the pier, 3rd December 1889.

One shot at Yarrow Slake, 1st January 1890.

One shot at Spittal a few days later.

Another near Berwick about same time.

On 29th or 30th January 1892, the late Mr. Evan G. Sanderson saw one amongst the trees on Bank Hill; and several others might be mentioned.

Most of the birds which occur here exhibit traces of immaturity in the barring of the plumage, more or less faintly in different individuals, of the under parts; and some of the specimens undoubtedly show only one white bar upon the wing, and are therefore perhaps referable to the more northern race, *Lanius major*, of Pallas.

RED-BACKED SHRIKE, *Lanius collurio*, Linnæus.—A rare accidental visitant, of which two examples have occurred in the borough. One was killed by a lad with a stone, at Tweedmouth, in the beginning of August 1879, and is preserved in the Museum here; the other was shot by my brother, on 15th September 1883, on the sea banks about a mile and a half north of Berwick, and is now in my collection. The day on which the latter was killed was thick and misty, and a Pied Flycatcher was found flitting about the rocks at high-water mark, near the same place. Both the shrikes are in immature plumage (see "Hist. Berw. Nat. Club," vol. ix. p. 165; and vol. x. p. 386).

WOODCHAT, *Lanius pomeranus*, Sparrman.—A rare bird throughout the country, and does not appear to have been noticed north of the Tweed. It ought not, strictly speaking, to be included in our list, but in the case of casual migrants a parliamentary boundary is irksome, and as two examples have occurred, only a few miles to the

south of the borough, it seems hardly proper to exclude it altogether. Hancock ("Birds of Northumberland and Durham," p. 42) records one, which was shot near Bamburgh, on 29th April 1859; and I was informed by Mr. Frederic Raine, of Durham, that about the middle of September 1876 he shot a specimen, on the links at Holy Island, but unfortunately lost it amongst the bents. Mr. Raine wrote of it as follows :—"I was on the links near the limekilns with W. Lilburn (pilot) when I saw it sitting on a clump of ragwort. After having a good look at it I called Lilburn to see it. He did not know it, and said it was a 'foreign bird.' He was carrying my gun, so I told him to shoot it. He fired, and the bird flew a short distance and dropped amongst the bents. Taking the gun, I went to where it fell; up it got, I fired, and it dropped amongst the bents again, and we could find nothing more of it."

WAXWING, *Ampelis garrulus*, Linnæus.—A rare and uncertain winter visitant, appearing in some seasons, in considerable numbers. There are plenty of records from the surrounding districts, but I do not find any for the borough itself, though Mordington, where an adult female was found dead, on the 11th December 1891, is just outside our parliamentary boundary. Several appeared upon the Borders in 1892 and 1893.

SPOTTED FLYCATCHER, *Muscicapa grisola*, Linnæus.—A common summer visitor, breeding in several places in the borough. I have sometimes noticed it, in autumn, visiting the gardens, in company with the little bands of Redstarts, Warblers, etc.; and on Holy Island, on 12th May 1884, I found a good many Spotted Flycatchers, mixed up with large numbers of Willow Wrens, Sedge Warblers, and Whitethroats. Most of these birds were evidently only resting upon the island, for not many or any of them nest there, and they were crowding together about the scant hedges and bushes, which grow upon the island. The actions of the warblers, in skulking about the hedges, seemed natural enough, but I was much struck with the way in which the Flycatchers sought shelter *in the middle of the bushes*, when disturbed, as though impatient of observation; and their movements amongst the branches contrasted so strongly with their usual habit of perching on the outside or topmost twigs only, that it was some time before I could satisfy myself that the birds I was watching were really Flycatchers, and not some sort of Whitethroat, or other large Warbler.

PIED FLYCATCHER, *Muscicapa atricapilla*, Linnæus.—Occurs irregularly, on migration, in autumn, and is rather less frequently observed in spring. Breeds intermittently in Northumberland, where I have found its nest in more than one locality, and has been reported also to have done so in Berwickshire.

A few years ago, I was accustomed to meet with it, in Ravens-

downe, from the middle to the end of September, but have not of late years been able to keep a very good look-out for it. In the spring I saw one in the garden there, on 4th May 1885 (the year in which it first appeared to any extent during summer). One was shot, at Castle Hills, on 26th April 1890, and another seen, at The Elms, on 8th May 1892. These were all males in the conspicuous black and white dress; the only female I have seen here in spring was one, which I picked up dead, by the roadside, near the Hope Nurseries, on 10th May 1891. It was in a very emaciated state, and had no doubt fallen a victim to the bleak and barren weather we experienced that season. On 10th June 1885, my brother saw a fine male, on the side of the Whitadder, below Edrington Castle, in Berwickshire.

As evidence of the lateness of its arrival on our shores, I may mention that the Rev. Charles B. Carr saw one upon the Farne Islands, on 16th May 1889.

RED-BREASTED FLYCATCHER, *Muscicapa parva*, Bechstein.—As already recorded ("Hist. Berw. Nat. Club," vol. x. p. 387, etc.), I was fortunate enough to meet with an example of this rare visitor, in the garden, at Ravensdowne, on 5th October 1883. It was a young bird, in the inconspicuous brown plumage of immaturity, and is still in my collection.

SWALLOW, *Hirundo rustica*, Linnæus.—A common summer visitor, arriving about the second week in April, and departing by the end of September. A few remain later, and may be met with throughout the following month. During the last nineteen years I have noticed it, on three or four occasions, about the town, in November, the latest date being 16th November 1887.

MARTIN, *Chelidon urbica* (Linnæus).—Not so abundant as the last, but large numbers breed under the ledges of the rocks, upon the cliffs, near Berwick, and northwards along the coast of Berwickshire. Under the parapets of the Royal Border Bridge, the Martin finds a secure site for its nest, and this is its principal breeding-place about the town. Although the bulk of them leave early in the autumn, belated individuals not unfrequently linger on until November, the latest date I have here being the 23rd of that month in 1889.

SAND MARTIN, *Cotile riparia* (Linnæus).—Common, and nests regularly in holes in the old town walls. I have sometimes also noticed it upon the sea banks, nesting in holes in the rock, rather than in the bank itself, though the latter is of course the ordinary situation, here as elsewhere. In 1881, I saw a nest in a hole in the wall, which encloses the policy, at Paxton House—a most unusual circumstance. The Sand Martin arrives before either of the two preceding species, in spring, and I have noticed it here as late as the 12th November, this in 1886.

GREENFINCH, *Ligurinus chloris* (Linnæus).—Abundant at all seasons, nesting commonly in the gardens of the town.

HAWFINCH, *Coccothraustes vulgaris*, Pallas.—Has been increasing its range northwards, during recent years, and has bred in one or two stations, in Northumberland, where I had the pleasure of seeing it nest, near Alnwick, in 1895. Mr. Thomas Darling, of Berwick, saw one on the sea banks a little to the south of Spittal, on 28th October 1880 (see "Hist. Berw. Nat. Club," vol. xiii. p. 348).

GOLDFINCH, *Carduelis elegans*, Stephens.—A rare visitor, but appears to breed, occasionally, within the borough. In June 1880, a pair were reported, by the gardener, to be frequenting the garden at Gainslaw House, and to have had a nest there "two years ago," when he "saw the old birds carrying food to their young"; and, on 25th July 1886, I saw a bird there, which was very noisy, and appeared to have young ones near at hand, though we could not find the nest. The gardener reported that a pair of them had appeared during the previous winter, and had remained about the garden ever since, and that he often saw them together. On 7th May 1882, and again on 13th September 1883, a single bird was noticed in the garden, at Ravensdowne; and on 10th December 1890 my sister Edith found a dead bird, with a wound on its back, floating in the Tweed, near the ruins of the old castle. On 30th May 1886, a pair were seen, by my brother, feeding upon thistles, in Tibby Fowler's Glen, near Edrington Castle, just over the boundary into Berwickshire; and when the Berwickshire Naturalists' Club visited St. Abb's Head, on 26th June, 1895, the lighthouse-keepers reported that they usually saw a few Goldfinches, about the Head, every winter.

In the adjoining parts of Northumberland, small parties of Goldfinches sometimes appear during hard weather, and are caught in snares, or with limed twigs; the neighbourhoods of Ancroft, Lowick, and the young woods between Scremerston and Unthank, being favoured localities.

SISKIN, *Carduelis spinus* (Linnæus).—Occurs locally in winter, in small flocks, in both the adjoining counties, where plantations of alder and birch are present. In the deep snowstorm of January 1879, I met with a single individual, upon the sea beach, a few miles south of our boundary.

SPARROW, *Passer domesticus* (Linnæus).—Common everywhere, and does considerable harm in gardens, etc. They consume quantities of insects, and their larvæ, no doubt, particularly during the period when they have young, but in early autumn they betake themselves in large flocks to the fields, and there show a decided preference for the ripening corn.

TREE SPARROW, *Passer montanus* (Linnæus).—A resident, and nests commonly in the town, in holes in the walls of the old ramparts,

and other convenient places ; and further afield in holes in trees, old buildings, lime-kilns, and the like. Is well distributed, and fairly plentiful, throughout the surrounding districts, on both sides of the Border, more especially along the sea coast. In Berwickshire it seems to have extended its range inland considerably, within the last ten or twelve years, and I have noticed it breeding at Paxton, Foulden, Hutton Hall, Chirnside, and other places.

In June 1878 I found several nests in the banks between Coldingham Shore and St. Abb's Head, and since that date I have frequently noticed it breeding there.

CHAFFINCH, *Fringilla cælebs*, Linnæus.—A common resident.

BRAMBLING, *Fringilla montifringilla*, Linnæus.—A winter visitant ; more abundant in some years than in others. Arrives about the beginning of October, and an odd bird sometimes lingers till late in spring. I saw a female in the garden, at Ravensdowne, on 1st May 1884, at which date Chaffinches had eggs, and on 10th April 1889, a fine male was quietly picking amongst some seaweed, close to the Pier House. In the autumn they have been observed at Ravensdowne : in 1882, on 12th and 16th October ; in 1883 and 1884, on 5th October in each year ; and, on 14th November 1877, a beautiful male came with the Sparrows to pick up some crumbs in front of my office window.

An old male, which had been caught in the snow, near the Tweed Dock, in 1877, lived with us for over three years, and became very tame, coming eagerly to take a fly, or other food, from the fingers, when held near his cage.

LINNET, *Acanthis cannabina* (Linnæus).—A resident, assembling in large flocks with other birds during snowstorms, and much sought after by our youthful bird-catchers on the "Meadows."

The nest is invariably placed in a whin bush, and, as the old Northumbrian proverb has it, "Whins and Fenwicks flourish everywhere," so that the Linnet finds no lack of congenial nesting-stations in the district.

MEALY REDPOLE, *Acanthis linaria* (Linnæus).—An occasional winter visitant, not always distinguished from the more common form. A male in my collection was one of two which we kept in confinement for some time, and which were snared at The Greens, during the great snowstorm, in the beginning of March 1886. On 21st October 1885, I saw two very pale-coloured individuals, feeding upon the street, with some Sparrows, near Dr. MacLagan's stable door in Ravensdowne. It is not included in Mr. Muirhead's book, but has since been recorded, as a Berwickshire bird, by Dr. Stuart, from a specimen seen by him, near Chirnside, on 25th November 1895 ("Ann. Scot. Nat. Hist.," No. 17, p. 58).

LESSER REDPOLE, *Acanthis rufescens* (Vieillot).—A pair or two nest, in suitable localities, in the adjoining parts of both counties, but to the borough itself it is only an occasional visitor, most frequent during hard weather, when I have noticed it several times about the town. It used sometimes to appear in the garden, at Ravensdowne so late as the middle of May; and on the 18th of that month, 1881, I saw one near the five-arch bridge at Tweedmouth, which looked as if it were nesting not far off.

TWITE, *Acanthis flavirostris* (Linnæus).—A winter visitant, as a rule; appearing sometimes in large flocks, usually near the sea-side. On 7th November 1881 I noticed it in the garden, at Ravensdowne; and on 23rd December 1887 my brother shot one, out of a mixed flock of Linnets and Finches, on the meadows, just north of the town.

On 23rd May 1877 I took a nest of this species, amongst heather on the sea banks, near Spittal; but this is the only instance, known to me, of its nesting in the borough.

BULLFINCH, *Pyrrhula europæa*, Vieillot.—A resident species, and not uncommon in the adjoining districts; but seldom strays far into the borough, where there is but little to attract it.

CROSSBILL, *Loxia curvirostra*, Linnæus.—Most erratic in its appearance, I have noticed it in some years, in considerable numbers, in North Northumberland, where it sometimes remains to breed. On 26th May 1895 I came upon a flock of perhaps thirty Crossbills, in the fir plantations, at Heathery Tops, just outside our boundary. In Berwickshire I noticed a party of about twenty frequenting the woods on banks of the Whitadder, at the Retreat, on 19th April 1889; and when the Berwickshire Naturalists' Club visited Bunkle, on 5th June 1895, we were shown several specimens preserved in the keeper's cottage, which had been obtained in the woods there, and at Cockburn Law, within recent years. The last specimen had been added to the collection only about a week before our visit, and we were informed that there were still some frequenting the plantations, where they had been regularly observed for some months previously.

In the middle of July 1888 a flock of about seventy appeared at the lighthouse, on one of the Farne Islands, one bird succeeding in killing itself against the glass; and in this connection it is interesting to note that Herr Gätke reported them "in swarms," on Heligoland, towards the end of June that year ("Naturalist" for 1888, p. 224).

TWO-BARRED CROSSBILL, *Loxia bifasciata* (C. L. Brehm).—On the visit of the Berwickshire Naturalists Club to Bunkle, on 5th June 1895, already alluded to in connection with the last species, I was agreeably surprised to find a specimen of this rare British bird, among the Common Crossbills, in the gamekeeper's cottage there. It had been shot, on 19th December 1889, in Staneshiel covert,

where it was found in company with some of the Common Crossbills (see "Hist. Berw. Nat. Club," vol. xii. p. 532).

This is an important addition to the Birds of Berwickshire, as well as to the Eastern Borders.

CORN BUNTING, *Emberiza miliaria*, Linnæus.—A common resident, breeding on the "Meadows" close to the town, and throughout the surrounding district. In winter it assembles in considerable flocks,—thirty or forty being sometimes seen together,—and then associates in the fields and stackyards with Larks, Finches, etc.

YELLOW HAMMER, *Emberiza citrinella*, Linnæus.—Abundant all the year round.

CIRL BUNTING, *Emberiza cirlus*, Linnæus.—A specimen in the Kelso Museum, referred to in Gray's "Birds of the West of Scotland," p. 132, as having been shot at Greenhill, near Yetholm, about the year 1840, seems to have escaped the notice of Mr. A. H. Evans, in his paper in the "Scottish Naturalist," for 1891.

This is a species I have always kept a look out for here, but have not, so far, succeeded in thoroughly identifying, though I was almost convinced that a pair of birds, which I met with at Castle Heaton, in Northumberland, on 1st January 1890, were Ciril Buntings. They were feeding at some stacks, by the roadside, in company with Finches and Yellow Hammers, but moved off at once, and, in the bad light which prevailed at the time, I may have been mistaken.

REED BUNTING, *Emberiza schæniclus*, Linnæus.—A common resident, breeding by the sides of the Tweed, and in other suitable places, and associating in small companies with the flocks of Larks, Finches, and kindred species on the "Meadows" in winter.

SNOW BUNTING, *Plectrophenax nivalis* (Linnæus).—An abundant winter visitant, assembling during hard weather in large flocks, particularly about the Freeman's "Meadows" to the north of the town. A few arrive about the middle of September, the flocks a month or six weeks later; and in the spring I have noticed single birds as late as the 5th of April. The great dissimilarity in plumage, as well as in the size, of these birds is very perplexing to our young ornithologists.

LAPLAND BUNTING, *Calcarius lapponicus* (Linnæus).—Has not yet been obtained here, but, in the snowstorm of January 1893, I met with considerable numbers on the coast, near Holy Island, about a dozen miles south of our boundary. They remained there at any rate up to 14th March following, on which date they were still numerous.

Large flocks of this species visited the eastern counties of

England during that winter, a lot of very interesting information regarding them having been published by Mr. J. H. Gurney in "The Transactions of the Norfolk and Norwich Naturalists Society," vol. v. p. 372, *et seq.*

On the 19th October 1893 I saw a single specimen upon the coast at Newton-by-the-Sea in Northumberland.

ON THE OCCURRENCE OF THE FRIGATE
PETREL (*PELAGODROMA MARINA*) ON
THE WEST COAST OF SCOTLAND.

By WM. EAGLE CLARKE, F.L.S.

A SPECIMEN of this stranger to European seas was captured alive on the margin of a stream on the west side of the island of Colonsay on the 1st of January of the present year. It was forwarded in the flesh to Edinburgh, where I had the pleasure of examining it and determining its identity.

On dissection, the bird proved to be a female, and an inspection of its bones indicated that it was quite a young bird. Among other evidences of incomplete ossification, the carina exhibited several fenestrations. The sternum of this species is extremely small.

The weather immediately preceding this bird's visit to the West Coast of Scotland was characterised by severe gales from the south-west, and these may, perhaps, have been instrumental in driving it from its accustomed haunts, the nearest of which are in the vicinity of the Canary Islands; but it is a wide-ranging species in the Southern Seas.

The only other visit of this petrel to Europe was also to the West Coast of Britain, a specimen having been washed up dead on the sands of Walney Island, Morecambe Bay, in November 1890, as recorded by the Rev. H. A. Macpherson.

This species varies in the coloration of the upper surface, some specimens being much more dusky than others, and this irrespective of age or sex.

NOTES ON LEPIDOPTERA COLLECTED IN THE
EDINBURGH DISTRICT.

By WILLIAM EVANS, F.R.S.E.

FOR many years, more indeed than at times I care to contemplate, the Lepidopterous fauna of Midlothian and the immediately surrounding counties has had a peculiar attraction for me. Almost from the outset an ample record of species captured or observed has been kept, and some three or four years ago the idea of drawing up a revised list of the Lepidoptera of the district took definite shape. But the bulk of the "Micros"—a veritable liliputian army—had still to be reckoned with; for, like the majority of collectors, I had hitherto confined my attention mainly to the "Macros." The attack on the Micros, which had previously been of a half-hearted kind, was taken up in earnest in the autumn of 1894, and continued throughout 1895—a singularly good year, by the way, for Lepidoptera, the fine spring and summer following an exceptionally hard winter. Indeed, it may safely be said of 1895 that a better season for entomological work in general has seldom been experienced in the district: at any rate I do not remember ever having here seen more insects dancing in the sunshine than during some of the hot days of the May and June of that year. Railway banks, hedge and ditch sides, edges of woods, meadows, and other favourable spots were at times literally alive with *Halonotæ*, *Stigmonotæ*, *Dicroramphæ*, *Eupæciliæ*, *Lampronæ*, *Micropteryges*, *Argyresthiæ*, *Gracilariæ*, *Coleophoræ*, *Elachistæ*, *Lithocolletes*, *Nepticulæ*, and other Micros, so that a couple of sweeps of the net was often sufficient to imprison a score of specimens. On the other hand, 1896—which was characterised by a wet summer and autumn, following a particularly mild winter—was almost as conspicuous a failure as 1895 was a success, and consequently yielded but small augmentation to my data. What the present year may yield remains to be seen, but in any case some time must elapse yet before my facts are sufficiently complete to warrant the issue of the

proposed list. In these circumstances it may be well to record now the more interesting of my recent captures; perhaps help from unexpected quarters may thereby be evoked. In the case of the *Micros* (to which unfortunately few collectors pay any heed) I have given a pretty full record, but as regards the *Macros*, only the less common (that is, in my experience) are mentioned.

A number of the species included in the following memoranda have not, so far as I know, been previously recorded for the district,—a few of them apparently not for any part of Scotland,—but I have not yet been able to look so thoroughly into the scattered literature as to feel justified in making positive statements in this respect.

Whatever difficulties may attend the collecting of *Micro-Lepidoptera*, they are as nothing compared to the difficulty of naming them; and I shall not readily forget the pleasure I experienced when Mr. Charles G. Barrett, F.E.S., consented to name specimens for me. I scarcely like to think of the extent to which I have already taken advantage of his able and ready assistance; but when I state that specimens of all the *Micros* and also of most of the smaller *Geometers* here recorded have passed through his hands, some idea of my indebtedness to him may be formed. He has earned my warmest gratitude, and, I need scarcely say, he has it.

In the matter of arrangement and nomenclature I have followed South's list,¹ that being, I understand, the one at present favoured by the Editors of the "Annals." Where the specific name adopted in that list displaces a familiar "Doubleday's list" one, the latter is given within brackets. The explicit adoption of the nomenclature of a particular list seems, in the case of papers like this, to do away with the necessity for writing the "authority" after each name; at any rate, I gladly avail myself of this view as an excuse for leaving them out on the present occasion.

Although scarcely falling within the title of my paper, I have availed myself of the opportunity to record a few interesting captures made, during April and May 1896, in the neighbourhood of Aberfoyle in the upper section of the

¹ "The Entomologist" synonymic list of British *Lepidoptera*, by Richard South (London, 1884).

"Forth" area. The locality is a good one, and if properly worked would, I am sure, yield a rich harvest.

It is just forty-five years since Lowe and Logan's List of the Lepidopterous Insects of Midlothian appeared in "The Naturalist."¹ Since then the district has, from various causes, still further deteriorated as a home for the majority of our Lepidoptera, and not a few that formerly could be obtained quite close to the city have now to be looked for much farther afield.

MEMORANDA UNDER SPECIES.

An asterisk before a name signifies that I am not aware of any previous record for Scotland.

RHOPALOCERA.

Euchloe cardamines.—The only examples of the "Orange Tip" I ever took in the district were obtained at Tynfield in East Lothian in May 1860 and 1861.

Argynnis selene.—Two near Falkland, 1st July 1888; common at Aberfoyle, end of May 1896. *A. euphrosyne*.—Also common at Aberfoyle last May. *A. aglaia*.—Leven Links, July 1879, several; Luffness and Gullane Links, 29th July 1883, common; Luffness Links, 10th August 1884, one.

Vanessa polychloros.—In the autumn of 1869 I saw an example of this fine butterfly within the grounds of Tynninghame, East Lothian, but failed to secure it. A specimen caught in a garden at Duddingston was exhibited by Mr. Logan at a meeting of the Royal Physical Society in March 1861. Of *V. io* I still possess one of two specimens captured at Buckstone, near Edinburgh, in 1860. In 1875 or 1876 one was taken at Cramond House. *V. antiopa*.—Have seen one which was taken near Doune in August 1878. *V. atalanta*.—Occurs annually in greater or less numbers; unusually abundant in 1893. *V. cardui*.—Scarce most years; fairly common in 1896—Merchiston, Auchendinny, Luffness, etc.

Pararge aegeria.—Thirty to thirty-five years ago I used to meet with this butterfly in a plantation at Biel, but have not since found it anywhere in the Lothians.

Satyrus semele.—Still occurs in a few localities, chiefly on or near the coast: Arthur's Seat, July 1889; Tentsmuir, July 1885;

¹ Some fifty "additions" were recorded by Logan in "The Naturalist" for 1853, and others are given in the Royal Physical Society's Proceedings for 1854-58.

Tynefield, August 1894, in the exact spot where I used to see them thirty to thirty-five years before; one, South Morningside, July 1896; also at Pettycur and Aberlady. *S. janira* is now also mainly a coast insect with us. I never see one, for instance, on or near the Pentland Hills; in August 1895, however, I met with it in some numbers about Falkland in the centre of Fife. *S. hyperanthus*.—Have not seen one in the Lothians for many years; used to take it at Biel and Tynninghame. Common at Lauder in 1895 (Mr. D. H. Low); Aberfoyle, 1896. *Cænonympha typhon* (= *davus*).—Took a specimen, which I still possess, on moor by the roadside immediately to the south of Leadburn, in July 1868.

Thecla quercus.—Captured one at Bracklyn Falls, near Callander, on 31st August 1877, and saw what I believe was another near Linlithgow in the summer of 1887. *T. rubi*.—Aberfoyle, 6th May 1872, one; Callander, 12th May 1894, several; Aberfoyle and neighbourhood, April (from 24th) and May 1896, abundant.

Lycæna astrarche, v. *Artaxerxes*.—It was on the coast of Fife, in July 1867, that I first made the acquaintance of this interesting little butterfly, and I have seen it there on many subsequent occasions, the last being on 26th June 1895, when dozens were to be seen on a certain flowery bank. In June 1872 I captured a specimen (in which the band of red spots is unusually well developed on the upper surface) on the Pentlands above Dolphington, and on 8th July 1890 I met with a few near Peebles. I have frequently looked for it in its historic locality on Arthur's Seat during the last twenty-five years, but without success, and believe it to be now extinct there. Mr. Andrew Wilson, however, found both larvæ and perfect insects in plenty in 1868. *L. minima* (= *alsus*).—On sea braes, Fife; usually about over when the last is at its best—in 1895 only a few, all more or less worn, were to be seen on 26th June when *Artaxerxes* was abundant and in perfection.

HETEROCERA

SPHINGES.

Acherontia atropos.—My specimens of the Death's-head are from the following localities: Pitcox, 1861; Oxwellmains, 25th September 1886; Musselburgh, 29th June 1891; and Harelaw, near Longniddry, July 1896; and I have recently seen a specimen taken at Springhill, Peebles, last September.

Sphinx convolvuli.—Specimens from the conservatories at Biel and Tynninghame, 1860-64; Liberton Brae, near Edinburgh, 7th July 1887; and Peebles, 7th October 1891, are in my collection.

Deilephila galii.—On 22nd July 1888 (the great *Galii* year) Mr. James Cockburn captured a female of this fine Hawk-moth in his garden, Malta Green Villa, Stockbridge, Edinburgh. It was taken to Mr. A. Wilson, who kindly handed it over to me.

Chærocampa porcellus.—One, coast west of Tyne Mouth, July 1883; one, Luffness Links, 28th June 1884; one, near Pettycur, July 1888; three, near Kinghorn, beginning of July 1896 (per Mr. W. E. Clarke); larva, Luffness Links, 19th August 1896.

Smerinthus populi.—Much our commonest Hawk-moth.

Macroglossa stellatarum.—Buckstone Farm, immediately to south of Edinburgh, August 1870 and 1871, captured several; one, Blackford Road, Edinburgh, 10th July 1887; one, Falkland, Fife, July 1888. *M. fuciformis* (= *bombylifomis*, Esp.).—One captured at Temple, Midlothian, on 23rd (not 20th) May 1896 ("Annals," 1896, p. 193). The Rev. James Blake informs me that it was taken in the manse garden while "hovering at the blossom of a purple lilac."

Trochilium crabroniforme (= *bembeciforme*, Hb.).—Pair taken at Auchenbowie, Bannockburn, 20th July 1894 (I have to thank Mr. P. H. Grimshaw for this record). In July 1895, and again in 1896, I found a good many empty pupa cases projecting from holes in poplars and willows at Luffness, but I failed to find any of the moths. Boswell Syme took a pair at Balmuto in 1871 ("Scot. Nat.," i. 154).

Sesia musciformis (= *philanthiformis*, Lasp.).—In September 1894 I found, on the coast between St. Abb's and Eyemouth, root-stocks of the Sea-pink bored, I believe, by the larvæ of this Clearwing, and Mr. Barrett, to whom I submitted a specimen, is of the same opinion. Diligent search on the coasts of the seaward portion of "Forth" would probably lead to the discovery of the insect there.

Zygæna filipendulæ.—North Berwick, Longniddry, Pettycur, etc.

BOMBYCES.

Halias prasinana.—Reared from larvæ, off oaks at Pressmenan and Biel, August and September 1894. Not "F." in "Lep. Scot."

Nudaria mundana.—Common near Peebles, 4th and 5th July 1890; one, Fushiebridge, 6th July 1895; etc.

Setina irrorella.—Larvæ abundant on rocks on the coast near Eyemouth, September 1894. Surely it must occur in like situations in the seaward portion of the "Forth" area also.

Euchelia jacobææ.—Abundant on coast links at Westbarns, North Berwick, Luffness, and Largo; one, Dalmeny Park, 2nd June 1895 (from Mr. C. Campbell).

Nemeophila russula.—Aberfoyle—larvæ in April; moths, 27th May.
N. plantaginis.—Bavelaw, Kirknewton, Ravensnook near Penicuik, Lomonds, etc.

Spilosoma lubricipeda.—Reared from larvæ got in gardens at Aberlady, September 1885, 1887, 1892, and 1896. Stands in Stewart's Edinburgh list (1809), but Lowe and Logan never met with it.

Hepialus hectus.—Aberfoyle, 23rd May; have never seen it in neighbourhood of Edinburgh. *H. sylvinus*.—Braid Hills, Portobello, etc. *H. velleda* and *H. lupulinus* are among our commonest moths.

Dasychira fascelina.—Found several pupæ on Tentsmuir, June 1885.

Orgyia antiqua.—Larvæ on roses, Tynefield, 1860-64; pupæ and moths abundant on moor near Thornton, September 1893; Tynninghame, September 1889 (G. Pow).

Bombyx rubi.—Pentlands, both east and west, on many occasions; observed many of the moths on wing in Boghall Valley on 5th June 1895, and counted about 50 larvæ on 9th November last; Selms, 1887 and 1895; etc. *B. quercus*, v. *callunæ*.—Larvæ, Callander, May 1894; and common about Aberfoyle during April and May 1896—one "spinning up," 24th May, and moth emerged, 5th July.

Odonestis potatoaria.—Reared from larvæ found near Callander in May 1894. During April and May 1896 the larvæ were abundant in damp, rushy spots all round Aberfoyle, and at Lake of Menteith. Blank for "Forth" in "Lep. Scot."

Saturnia pavonia (= *carpini*).—Observed annually on the Pentlands; Ravensnook, Lomonds, Doune, etc.

Drepana lacertinaria.—Miss Balfour, Whittinghame, has kindly shown me a specimen taken at Pressmenan, 10th July 1872. Not marked "Forth" in Buchanan-White's "Lep. Scot."
D. falcataria.—Tentsmuir, June 1895 (D. H. Low).

Cerura vinula.—Seldom met with about Edinburgh now. Several reared from larvæ off willows, Braid Burn, August 1870; one, Drylaw, near Davidson's Mains, May 1873; larvæ, Tentsmuir, July 1885, and near Markinch, August 1895.

Lophopteryx camelina.—One, Aberlady, 25th July 1883; one reared from larva off beech, Lundin Tower, Fife, 9th September 1893; one, Swanston Wood, 5th June 1895; larva off alder, near Falkland, 14th August 1895. In Stewart's 1809 List of Edinburgh Insects; but supposed by Lowe and Logan to have been erroneously inserted.

Notodonta dictæa.—Larva, Newhall, Carlops, 22nd October 1887; several larvæ, Aberlady, September 1892; common in larval state, West Wemyss, Fife, September 1893; the moths emerged July 1894. *N. dromedarius*.—Several from larvæ, Micklerig Wood, East Lothian, many years ago; one from larva off birch, Tynefield, 21st August 1894.

Thyatira batis.—Tynefield, July 1863; two, Muirhouse, near Granton, about 1870 (G. Hutchison); two, Corstorphine Hill, 9th June 1875 (W. A. Forbes, "Scot. Nat.," iii. 264).

Cymatophora duplaris.—Several larvæ off birch, West Wemyss, August 1893.

Asphalia flavicornis.—Common, in pairs, on the twigs of tiny birches, near Kirknewton, 6th April, and one, West Wemyss, 8th April, 1895. I had previously discovered the larvæ at both places. Miss Balfour has kindly shown me specimens taken at Whittinghame in 1872. Not "F." in "Lep. Scot."

NOCTUÆ.

Bryophila perla.—Arthur's Seat, Longniddry, Aberlady, Falkland, Crail, etc.

Demas coryli.—One larva near Temple, 27th July 1893; two off alders, Blairadam, 20th July 1895—moths emerged 6th May following.

Leucania lithargyria.—Pettycur, June 1895, etc. *L. comma*.—Common on damp spot, Luffness Links, July 1883, and a few in 1892.

Gortyna ochracea (= *flavago*).—In the end of September 1892 I found empty pupa cases in stems of burdock, near Aberlady, and in July 1895 I obtained numbers of the larvæ in the same neighbourhood, the perfect insects emerging in end of August and beginning of September. On 2nd October 1894 I captured a specimen of the moth at Tynefield.

Axylia putris.—Three, Meggetland, near Edinburgh, July 1881; one, from larva, Tynefield, September 1894.

Neuronia popularis.—One, Tynefield, at light, 30th August 1894.

Mamestra furva.—Arthur's Seat, Morningside, Aberlady, July 1895.

Miana strigilis.—Aberlady, July 1883. *M. literosa* and *M. arcuosa* both fairly common.

- Celæna haworthii*.—Bavelaw Moss, Dalmahoy, Harper-rig, Long-niddry Links, near Peebles, etc.
- Caradrina taraxaci* (= *blanda*).—Arthur's Seat, June, and Luffness Links, July, 1895.
- Rusina tenebrosa*.—Lochgelly, 21st June 1887.
- Agrotis cursoria*.—A few, Tynefield, August 1894. *A. obelisca*.—Arthur's Seat, 8th August 1893. *A. lucerneæ*.—Reared from larvæ got at foot of Salisbury Craggs in March 1882, 1888, 1893, and 1895.
- Noctua triangulum*.—Two, Meggetland, July 1881; two, Morningside Park, at light, 21st July 1895. *N. festiva*.—Merchiston, Dreghorn, Currie Moor, Swanston. *N. umbrosa*.—Gosford Links, Falkland, etc.
- Mania maura*.—Tynefield, 1860-64, and again in September 1894; St. Andrews, 1891. *M. typica*.—Fairly common.
- Panolis piniperda*.—Bavelaw Wood, towards end of April, almost yearly since 1881. Was taken there by Dr. Lowe in 1854; near Kirknewton, April 1895; Selms Wood, May 1895; etc.
- Pachnobia rubricosa*.—Near Marchbank, Balerno, May 1883; one on high moor behind Aberfoyle, 16th April 1896; no willows within at least a mile. Pentlands (Logan, "Naturalist," 1853).
- Tæniocampa pulverulenta* (= *cruda*).—A few, Callander, at "sugar," 1st May 1892. Not marked "Forth" in "Lep. Scot."
- Orthosia lota*.—Aberlady, at "sugar," 7th October 1893; near Kirknewton, at "sugar," 30th September 1895. *O. macilentæ*.—Dalkeith Park, at "sugar," 3rd October 1891; one, Biel, on oak trunk, 15th September 1894.
- Xanthia fulvago* (= *cerago*).—West Wemyss, August 1893; Falkland, August 1895. *X. flavago* (= *silago*).—Crawhall, near Torphichen, August 1895.
- Dianthæcia nana* (= *conspersa*).—Meggetland, Braid, Fushiebridge, Aberlady, North Berwick, etc. *D. capsincola*.—Larvæ very common in seed capsules of common *Lychnis*. *D. cucubali*.—Larvæ fairly common on ragged robin; Mortonhall, Bavelaw, Kirknewton, Falkland, etc. *D. carpophaga*.—Not so often met with as the others: several, North Berwick, at flowers of the bladder campion, 28th June and 2nd July 1884; larvæ, common, on same plant, Aberlady, August 1885, and a few in 1892 and 1895.
- Dasypolia templi*.—One, Merchiston, 11th October 1882; one, Isle of May, 17th September 1885; female, Bavelaw Wood, 21st April 1888; two, Morningside Park, Edinburgh, at light, 26th September 1895; one, Colinton, on lamp, 17th October 1895;

also taken near Linlithgow in 1895 by Mr. A. Duncan. Boswell Syme has recorded it ("Scot. Nat.," i. p. 42) from Balmuto in 1868, and from near Kirkcaldy in 1869.

Agriopsis aprilina.—This beautiful moth is not uncommon on oak trunks in September and October; I have taken it at Duddingston, Dalkeith Park, Kirknewton, Dalmeny, Biel, Kiel's Den near Largo, etc.

Euplexia lucipara.—Two, Meggetland, July 1881; one, on window of the Bank of Scotland, Edinburgh, 5th July 1884; one reared from larvæ got at Tynefield, September 1894; two, Merchiston, June 1895.

Hadena pisi.—Penicuik, Bavelaw, etc.; the beautiful larvæ were very common on bracken and buckthorn on Hedderwick Hill Links in August 1894. *H. adusta*.—Near Balerno, Silverburn, Newpark.

Calocampa vetusta.—Several, Callander, at "sugar," 30th April 1892; two, near Kirknewton, at "sugar," 30th September 1895. On the latter occasion *C. exoleta* was in great abundance, as was also *Xanthia circellaris* (= *ferruginea*), *Anchocelis litura*, *Scopelosoma satellitia*, *Miselia oxyacanthæ*, *Phlogophora meticulosa*, etc.

Gonoptera libatrix.—Rare; Tynefield and Penicuik.

Habrostola tripartita (= *urticæ*).—Aberlady, North Berwick, etc.

Plusia chrysitis.—Near Slateford, Longniddry, Aberlady, North Berwick, etc. *P. festuæ*.—St. Andrews, July 1890; Dalmeny, July 1893.

Anarta myrtilli.—Moor near Thornton, larvæ common in September 1893; Bavelaw Moss, common in June 1895; etc.

Charidea umbra (= *marginata*).—Two at *Silene*, North Berwick, July 1884; a good many reared from larvæ got on rest-harrow at Pettycur and Biel in August 1894. Taken at Balmuto by Boswell Syme in July 1874 ("Scot. Nat.," iii. p. 265).

Phytometra viridaria (= *ænea*).—Common at Aberfoyle in May last. Pentlands (Logan, "Naturalist," 1853, p. 70).

Euclidia mi.—Abundant, Gosford Links, 28th May 1881; one, near Burntisland, 30th May 1895.

GEOMETRÆ.

Elloppia prosapiaria (= *fasciaria*).—Fir woods near Balerno, Falkland, etc.

Crocallis elinguarid.—Tynefield, Aberlady, Falkland, etc.

Himera pennaria.—Aberlady, 1892; several reared from larvæ off oak, Aberfoyle, May 1896. I have seen specimens in Miss Balfour's collection at Whittinghame, which were taken there in the seventies.

- Amphidasys betularia*.—Biel; Pressmenan, 1894.
- Cleora lichenaria*.—Six, Carrington, near Temple, on trunks of ash trees, 9th July 1885.
- Gnophos obscuraria*.—Two, Arthur's Seat, 22nd July 1895, and common on seabanks near Eyemouth same year. I have seen specimens from North Berwick Law.
- Acidalia remutaria*.—Common in oak coppices, Aberfoyle, May 1896. Not given for "Forth" in Buchanan-White's catalogue.
- Cabera exanthemata*.—Near Polton, May 1882. *C. pusaria*.—More common.
- Macaria liturata*.—Fir woods, Macbiehill and Balerno.
- Panagra petraria*.—One, Aberfoyle, 24th April 1896; common three to four weeks later. Not recorded for "Forth" in Buchanan-White's catalogue.
- Numeria pulveraria*.—Two, Aberfoyle, 27th May; Bavelaw, May 1887 (Dr. Carlier, "Annals," 1892, p. 44).
- Scodiona belgiaria*.—One, Currie Moor, Pentlands, July 1880; four, Bavelaw Moss, 22nd and 24th June 1895—all females.
- Hybernia leucophaearia*.—Half a dozen, Dalkeith Park, March 1892; a few, Dalmeny Park, March 1893—all males.
- Anisopteryx æscularia*.—One, Tentsmuir, near Leuchars, 21st March 1896 (D. H. Low).
- Oporabia filigrammaria*.—One, Bonaly, 11th September 1881; one (which Mr. Barrett has seen) near Kirknewton, 26th August 1895.
- Emmelesia decolorata*.—Roslin Woods, Dalmeny, Aberlady (abundant in June 1890), Pettycur. *E. unifasciata*.—One, Longniddry, on wall, 26th July 1884. I have seen no previous record for "Forth." *E. minorata* (= *ericetata*).—A few, Bavelaw Moss, 4th and 11th August 1884; several, Lomonds, 7th and 8th August 1895.
- Eupithecia pulchellata*.—Merchiston, Braid Hills, Mortonhall, Falkland. *E. oblongata* (= *centaureata*).—Luffness, Tynninghame (larvæ abundant on ragwort), Pettycur. *E. pygmaea*.—In marshy spots, fairly common; Braid, Balerno, Newpark, Manuel, Ormiston, Lochgelly, Falkland, etc. *E. helveticaria*.—Larvæ still abundant on juniper on the Pentlands in September. On 5th June 1895 I beat a few of the moths out of the bushes. One, Aberfoyle, 6th May 1896. On 6th June 1882 I took on Bavelaw Moss, among heather (no juniper anywhere near), a specimen which Mr. Barrett refers to the variety *arceuthata*. *E. satyrata*.—Common; larvæ on flowers of *Scabiosa succisa*. *E. castigata*.—Dalmeny Park, Aberlady,

Tynninghame. *E. fraxinata*.—Reared from larvæ got at Kirknewton and Tynefield, 1894. *E. indigata*.—Common about fir woods in June. *E. nanata*.—Common among heather on all our hills and moors. *E. absinthiata*.—A few, Luffness Links, on *Ballota*, July 1895. *E. minutata*.—Reared from larvæ on heather, West Wemyss, September 1893; Hedderwick, 1894; Kirknewton, 1894. *E. lariciata*.—A few yearly since June 1887 in fir wood near Kirknewton; one, near Fushie-bridge, 6th July 1895. Not given for "Forth" in Buchanan-White's list. *E. abbreviata*.—Common in oak coppices, Aberfoyle, April and May. *E. sobrinata*.—Reared in abundance from larvæ off juniper on Pentlands, beginning of June 1895; moths there September 1890; Merchiston, on lamps, July and August. *E. pumilata*.—Abundant near West Wemyss, Fife, flying about young spruces in afternoon, 30th May 1895. Not marked for "Forth" in Buchanan-White's list. *E. vulgata*, *E. assimilata*, *E. exigua*, and *E. rectangulata* are all more or less common about gardens and hedges.

Thera simulata, Hb. (= *coniferata*, Curt.).—Reared from larvæ off juniper on Pentlands, 10th June 1895. *T. firmata*.—Not uncommon on Scotch fir; Bavelaw, Mortonhall, Gladsmuir, Tynefield.

Hypsipetes trifasciata (= *impluviata*).—West Wemyss, Stenton, etc.

Melanthia bicolorata (= *rubiginata*).—Polmont, Otterston, Wemyss, Falkland.

Anticlea badiata.—Colinton, Tynefield.

Coremia munitata.—Colinton, Swanston, Bonaly Hill, Kirknewton, Lomonds. *C. designata* (= *propugnata*).—Falkland, June 1888. *C. ferrugata*.—Aberfoyle, 24th May.

Phibalapteryx vittata (= *lignata*).—Abundant at Luffness marshes on the evenings of 10th and 12th July 1895.

Cidaria siterata (= *psittacata*).—One, Tynninghame, 6th September 1894; Whittinghame (Miss Balfour). *C. miata*.—Biel; Merchiston, 17th October 1894. *C. corylata*.—Aberfoyle, 22nd May. *C. silaceata*.—One, Dalmeny Park, June 1880. *C. dotata* (= *pyraliata*).—Far from uncommon; have taken it in many localities.

Pelurga comitata.—A few, Aberlady, July 1895.

Eubolia cervinata.—Two, Aberlady, 6th September 1886, and another 23rd August 1892.

Anaitis plagiata.—Two, Pentlands, July 1880.

Tanagra atrata (= *chærophyllata*).—Biel, June 1863.

PYRALIDES.

Aglossa pinguinalis.—Tynefield, in house, August 1894.

Pyralis farinalis.—Locally common; Buckstone Farm, Morning-side, etc.

Scoparia cembra.—Two, Dalkeith Park, July 1892; several, Morningside, July 1895. *S. ambigua*.—Balerno, Kirknewton, Newpark, Blairadam, etc. *S. atomalis*.—Mr. Barrett has referred specimens I sent him from fir woods at Kirknewton and Drumshoreland to this form, and I believe I have it from other localities, but find some difficulty in separating it from the last. *S. dubitalis* and *S. murana* are both abundant. *S. mercurella*.—Dunfermline, 30th July; Falkland, 14th August. *S. cratægella*.—Dean Park; Manuel. *S. angustea* (= *coarctalis*).—Aberlady, 17th August, 13th September; Tynninghame, 23rd August. *S. pallida*.—Common, Luffness marshes, July 1895.

Nomophila noctuella (= *hybridalis*).—One, Gullane Links, September 1885.

Pyrausta purpuralis.—Several, Falkland, Fife, August 1895.

P. ostrinalis.—Two, Luffness Links, August 1896.

Herbula cespitalis.—Abundant; Pentlands, Arthur's Seat, Luffness Links, Lomonds, etc., May, and again in July and August.

Scopula olivalis.—Common, Corstorphine Hill, 26th June; Newpark, 18th July. *S. prunalis*.—Aberlady, 11th July; Winton, 4th July; Falkland, August. *S. ferrugalis*.—One, Luffness Woods, 11th September 1892. *S. lutealis* is very common, as are also *Botys fuscalis* and *Pionea forficalis*.

PTEROPHORI.

Platyptila isodactyla?—A "Plume" taken off a lamp at Merchiston in October 1894, though too much damaged for certain determination, is probably of this species. *P. gonodactyla*.—North Berwick, June; Newpark, 17th July; Otterston, 31st July; Winton, 4th July.

Amblyptilia acanthodactyla.—Common on an open, heathy spot, surrounded by young spruce trees, near Wemyss, Fife, 30th May 1895. *A. cosmodactyla* (= *punctidactyla*).—One, off oak, Pease Dean, Berwickshire, 4th October 1894.

Mimæseoptilus bipunctidactylus.—Much the most abundant of our "Plumes." *M. pterodactylus* (= *fuscus*).—Also common; Braid, Longniddry, Pettycur, etc.

Pterophorus monodactylus.—Gullane Links, October 1893; near Kirknewton, 30th September 1895; etc.

Alucita hexadactyla (= *polydactyla*).—In 1895 I found what I believe to have been the larvæ of this interesting species on honeysuckle at Gosford, East Lothian, but I have not yet succeeded in finding the moth itself. Lowe and Logan recorded it, however, from Duddingston and Balgreen.

CRAMBI.

Crambus dumetellus.—Fairly common on Longniddry and Luffness Links in July 1895. *C. pinellus* (= *pinetellus*).—A single specimen of this pretty species was beaten from an elm on Corstorphine Hill on 27th June 1895. *C. perlellus*, var. *warringtonellus*.—Abundant on Luffness Links, July 1895. *C. geniculeus*.—One, Isle of May, 13th September 1888; half a dozen, Sandyhurst, Tynninghame, 23rd August 1894; one, Luffness Links, 24th August 1896. *C. pratellus*, *C. tristellus*, *C. culmellus*, and *C. hortuellus*.—All more or less abundant.

Homœosoma nimbella.—One, in my little garden, Morningside Park, Edinburgh, 25th June 1895. **H. binævella*.—Four, Luffness Links, among burdock, 12th July 1895.

Phycis fusca (= *carbonariella*).—A few, on charred stems of furze, Braid Hills, 1st July 1895.

Oncocera ahenella.—Several, Pettycur, 29th June 1889, and again 4th June 1895. W. A. Forbes took it in this same locality in June 1874 ("Scot. Nat.," iii. p. 64).

Aphomia sociella.—Tynefield, many years ago; Upper Braid Farm, June 1889; Braid Hills, July.

TORTRICES.

Tortrix xylosteana.—Fairly common; Riccarton, Newpark, Falkland, Torphichen, Luffness, etc. *T. costana* (= *spectrana*).—Duddingston, 29th June; Luffness Marshes, abundant, 12th July. *T. viburnana*.—Pair, Bavelaw Moss, 24th June; common, Selms Moor, 29th July; abundant, Lomonds, 8th August; a few, Kirknewton, 25th August. *T. palleana* (= *icterana*).—Common; Comiston, Ravensnook, Balerno, Winton, Pettycur, etc., June and July. *T. rosana*, *T. heperana*, *T. ribeana*, and *T. viridana* are all very abundant. *T. ministrana*.—Common among birches, Aberfoyle, 23rd and 27th May. Recorded for Pressmanan by Logan.

Amphisa prodromana.—Reared from larva got at Ravelrig in August 1892; moths common near Callander, 1st May.

Leptogramma literana.—One, very green, on oak trunk, Biel, 1st October 1894.

- Peronea rufana*.—One, Flanders Moss, 1st May 1896. *P. mixtana*.—Common on Pentland Hills in October and March. *P. schalleriana*.—Common, Luffness Woods, among birches, 11th September; near Torphichen, 8th August; Yester, 16th September. *P. comparana*.—Common in September and October. *P. perplexana*.—One, Luffness Woods, 11th September 1892; one, Tynninghame, 10th September 1894: both identified by Mr. Barrett. *P. hastiana*.—A few, Balerno, on alder, 10th October. *P. maccana*.—One, Dreghorn, July 1891; one, Duddingston, 8th August 1893; one, Biel, 5th October 1894. *P. caledoniana*.—Abundant, Pentlands, 21st July; Bonaly Hill, 31st August; Auchincorth Moor, 29th July; Lomonds, 7th and 8th August. **P. shepherdana*.—Mr. Barrett has so named a richly coloured (♀) *Peronea* reared from larvæ found feeding on meadow-sweet, near Ormiston, East Lothian, 5th July 1895. *P. aspersana* and *P. ferrugana*.—Common. *P. variegana* and *P. sponsana* (= *favillaceana*).—Abundant.
- Rhacodia caudana*.—Locally common; Luffness, Tynninghame, Torphichen, Falkland, August and September.
- Teras contaminana*.—Abundant.
- Dictyopteryx laeflingiana*.—Rather common; Newpark, Luffness, Tynefield, Falkland, etc. *D. bergmanniana*.—Common.
- Argyrotoxa conwayana*.—Fairly common; Corstorphine, Dreghorn, Roslin, Winton, etc.
- Ptycholoma lecheana*.—Dalkeith Park, 30th July 1892.
- Penthina sororculana* (= *prælongana*).—A good many near Kirknewton, 28th May, etc.; Aberfoyle, 23rd May. *P. pruniana*.—Blackford Hill, 19th June; Aberfoyle, 25th May. *P. variegana* (= *cynosbatella*).—Fairly common; Dreghorn, Aberlady, Winton, etc.
- Spilonota neglectana*.—Single specimens: Merchiston, 24th June; Aberlady, 10th July; Newpark, 17th July; Dunfermline, 30th July.
- Pardia tripunctana*.—Common.
- Sericoris cespitana*.—Abundant on Gullane Hill in July 1895; a few, Arthur's Seat, same month. *S. urticana*.—Common in oak coppices, Aberfoyle, in May—plenty of wild sage growing about. *S. lacunana*.—Very common.
- Mixodia schulziana*.—Locally common; Bonaly Hill, Bavelaw, Kirknewton, Lomonds.
- Orthotænia antiquana*.—Duddingston Loch, Comiston, Luffness Marshes, and near Falkland.

Cnephasia politana (= *lepidana*).—Locally common; Pentlands above Silverburn, 27th May; Aberfoyle 5th and 6th May.
C. musculana.—Rather common; Kirknewton, Newpark, Wemyss, etc.

**Sciaphila conspersana*.—Mr. Barrett refers a specimen reared from a larva found on *Petasites*, banks of Water of Leith, Gorgie, 25th June 1895, to this form. *S. virgaureana*.—Very abundant; occasionally nearly black. *S. octomaculana*.—Newpark, Elie, Falkland. *S. penziana*.—A few, Arthur's Seat, on rocks, 10th August 1892; and again, 22nd July 1895.

Clepsis rusticana.—Locally common; Kirknewton, Silverburn, Drumshoreland, Wemyss; May and June.

Bactra lanceolana.—Common. *B. furfurana*.—Common: Duddingston Loch, on *Eleocharis*, 29th June; Drumshoreland Curling Pond, on same; Luffness Marshes.

Phoxopteryx unguicella (= *unguicana*) and *P. lundana*.—Both common. *P. biarcuana*.—One, Aberfoyle, 26th May. *P. myrtilana*.—Not uncommon; Pentlands (Boghall and Swanston), 5th and 10th June; Newpark, 7th June; etc.

Grapholitha ramella (= *paykulliana*).—Falkland, 8th August; Pressmenan, 25th August. *G. nisella*.—One, wood at Gladsmuir, 12th September 1896. *G. nigromaculana*.—One, Longniddry Links, 2nd July 1895. *G. subocellana* (= *campoliliana*).—Locally common; Drumshoreland, Kirknewton, Crawhall, and Bowhouse, etc. *G. trimaculana* and *G. penkleriana*.—Both abundant. *G. nævana*.—Common.

Phlæodes tetraquetra.—Common, near Kirknewton, 28th May 1895; Drumshoreland, 8th June.

Hypermeria cruciana, L. non Zett.—Common near Kirknewton, July 1894; and at Newpark, July 1895.

Batodes angustiorana.—Common on yew hedge, Morningside, July 1896; Aberlady; Tynefield.

Pædisca ratzeburgiana (= *Mixodia ratzeburgiana*).—Common, West Wemyss, on spruce, 14th August 1893; a few, Falkland, on silver fir, 4th and 7th August 1895. *P. rubiginosana* (= *M. bouchardana*).—Common in young fir plantation, Drumshoreland, 8th June 1895; Kirknewton 23rd May, etc. *P. ophthalmicana*.—One, Luffness Woods, 11th September 1892. *P. occultana*.—Morningside, Midcalder, Falkland, on conifers. *P. corticana* and *P. solandriana*.—Both common; Lothians and Fife. *P. sordidana*.—Less so; near Torphichen, 31st August; Kirknewton, Biel, Tynefield, September.

- Ephippiphora (Halonota) similana* (= *bimaculana*).—One, Luffness Woods, 11th September 1893; one, Drumshoreland, 13th, and several, Wemyss, 4th September 1893; banks of Avon near Torphichen, 31st August 1895. *E. pflugiana* (= *scutulana*).—More common; Midcalder district, Boghall, Bowhouse, etc. *E. cirsiana* and *E. brunnichiana*.—Both abundant, the latter especially.
- Coccyx cosmophorana*.—One, near Kirknewton, 28th May 1895. *C. nemorivaga* (= *tadana*).—One, near Belstane, south of Midcalder, June 1891. *C. tadella* (= *hyrciniana*).—Abundant about spruce trees. *C. distinctana*.—Several off young spruce, Boghall, 5th June 1895. *C. nanana*.—One, Winton, East Lothian, at spruce, 4th July 1895.
- Pamplusia mercuriana* (= *monticolana*).—Abundant on the Pentlands and Lomonds in July and August.
- Retinia turionana*.—Several, near Kirknewton, 23rd May 1895. Mr. Barrett names these *R. posticana*, ? var. of *turionana*. *R. pinivorana*.—Half a dozen, Drumshoreland, off young Scotch firs, 8th June 1895.
- Endopisa nigricana* (= *nebritana*).—Two, Ormiston, East Lothian, 5th July 1895.
- * *Stigmonota ravulana*.—One, off birch, Aberfoyle, 23rd May 1896. Mr. Barrett, who believes he has correctly determined this specimen, says the dorsal marking is unusually white. *S. coniferana*.—One, near Kirknewton, 20th July 1894. *S. perlepidana*.—Common; near Dalkeith, 26th April; Glencorse, 5th May; etc. * *S. internana*.—A few, near Buckstone, on whin, 28th June 1894; common, Braid Hills, flying about whin bushes in the sunshine, 21st June and 1st July 1895. This is an interesting discovery. When on wing it has a much whiter appearance than *Catoptria ulicetana*, with which it intermingles.
- Dicrorampha petiverella*.—Fairmilehead, Roslin, Hedderwick Hill, etc., July and August. *D. acuminatana*.—One, Biel, 5th September 1894; one, Pettycur, 4th June 1895. *D. plumbana* and *D. herbosana*.—Both abundant, especially the latter, on grassy banks in July.
- Pyrodes rhediella*.—A few, Aberfoyle, 26th May.
- Catoptria cana*.—Fairly common in June and July; Corstorphine Hill, North Morton, Aberlady, Pettycur. *C. scopoliانا*, Haw. non D. L.—One, Kirknewton, 20th June; one, Luffness, 10th July; two, Pettycur, 8th August. *C. ulicetana* is very abundant on furze.
- Trycheris aurana* (= *mediana*).—A few, Winton, 4th July; a good many, Ormiston, 5th July; and near Portobello, 7th July.

Symæthis oxyacanthella (= *fabriciana*).—Everywhere.

Eupæcilia nana.—A few, Aberfoyle, among birch, 23rd May. *E. dubitana*.—Abundant, Pettycur sea braes, 4th June 1895. *E. atricapitana*.—One, Luffness Links, on hound's tongue, 12th June 1894. *E. maculosana*.—Several, Aberfoyle, among broom, 25th May. *E. angustana*.—Abundant. *E.^a ciliella*.—Common, Bavelaw Moss, 27th May; Boghall, Pentlands, 5th June; Aberfoyle, 7th May.

Xanthosetia hamana.—One, Pettycur, 26th June; two, Ormiston, 5th July.

Argyrolepis hartmanniana (= *baumanniana*).—A good many, near Kirknewton, 25th May and 13th June. *A. badiana*.—Half a dozen, Luffness Links, on burdock, middle of July 1895.

Conchylis straminea (= *stramineana*).—Common and wide spread.

Aphelia osseana (= *pratana*).—Abundant, both on inland moors and on the coast.

Tortricodes hyemana.—Abundant in oak coppice, Callander, April 1892.

TINEÆ.

Exapate congelatella.—Males common on the Pentlands, 17th and 30th October, and 6th November; one, Comiston, on wall, 30th October.

Diurnea fagella.—Common on tree trunks in April.

Solenobia, sp.?—In March 1895, at Mr. Barrett's request, I went in search of *Solenobia* cases on rocks on the Pentlands, and found a good many, some of them containing living larvæ, none of which reached the perfect state, however. Others were obtained on Arthur's Seat and near Fairmilehead in October. Possibly the species is *S. triquetrella*, but until we rear or otherwise obtain a male imago the point will be hard to settle.

Ochsenheimeria bisonella.—Common; near Kirknewton, 31st July and 8th August; Tynninghame, 22nd August and 2nd September; Lomonds, 6th August.

Tinea tapetzella.—Local; common, Tynefield, in stable, August 1894; Morningside, August 1895.

* *T. pallescentella*.—One, Morningside, July 1891, identified by Mr. Barrett. *T. granella*, *T. cloacella*, *T. pellionella*, *T. lapella*, and *T. rusticella*, are all more or less common. Specimens of the last named taken in woods at a distance from houses seem to me to have the purple tint on the wings more pronounced.

Phylloporia bistrigella.—Rather scarce; woods near Kirknewton, 28th May and 7th August; Newpark, 7th June and 18th July, etc.

Tineola biselliella.—Only too common in many houses.

Lampronia luzella.—Five, Falkland, 9th August 1895. Taken at Tranent by Logan many years ago ("Naturalist," 1851, p. 71).

L. rubiella.—Common among wild raspberry; Corstorphine Hill, Midcalder, Penicuik, June.

Incurvaria muscalella (= *masculella*).—Common; near Kirknewton, 23rd May; and at West Wemyss, 30th May.

Micropteryx calthella.—Corstorphine Hill, 27th June; Ormiston, East Lothian, 5th July, a few. *M. seppella* (Meyrick unites this to *Aruncella*, Scop.)—Abundant. **M. mansuetella*.—One, Aberfoyle, 22nd May 1896. *M. aureatella* (= *allionella*).—Common; West Wemyss, 30th May; Newpark, 7th June; Aberfoyle, 26th May. *M. subpurpurella*.—Mortonhall, 9th May; Aberfoyle, 1st May.

Adela rufimitrella.—One, Newpark, 7th June 1895. *A. fibulella*.—Two, Dura Den, July 1890; one, Aberfoyle, 26th May 1896.

Swammerdamia griseocapitella, Doub. List.—Common; near Wemyss, on birch, 30th May; Aberlady, July; Pettycur, August. *S. pyrella*.—Several, Greenbank, on hawthorn, 3rd June 1895.

Hyponomeuta padellus.—Common in gardens, Aberlady, on apple.

Prays curtisellus.—Not unfrequent; Craiglockhart, Morton, Newpark, Gosford, etc.

Plutella cruciferarum.—Common; sometimes only too abundant for the good of the turnip crop. 1891 was the last really bad year. *P. porrectella*.—In my garden, Morningside, 27th June 1895. *P. annulatella*.—One, Gullane Links, 10th September 1896; several near St. Abb's the previous September. *P. dalella*.—Common; Pentlands, Bridge of Allan, Gullane, etc.

Cerostoma vittella.—Fairly common; Colinton, Torphichen, Gosford, Tynninghame, Falkland (very dark variety). *C. radiatella*.—Very common; beautiful variety (white with black streak), Falkland, August 1895.

Harpieteryx xylostella (= *harpella*).—Not uncommon; Dalkeith Park, Roslin, Newpark, Luffness, etc.

Orthotelia sparganella.—One, Luffness Marsh, 10th July 1895.

**Phibalocera quercana*.—One, Grange, Edinburgh, on gas lamp, 14th August 1892.

Depressaria subpropinquella.—One, Westbarns Links, East Lothian, 27th August 1894. *D. alstræmeriana*.—Common, north side of Tynninghame Bay, August 1894. *D. liturella*.—Pettycur and Tynefield, August 1894. **D. carduella*.—One, Pease Dean, Berwickshire, 4th October 1894. *D. badiella*.—One, Westbarns Links, 27th August 1894. *D. costosa*, *D. arenella*, *D. applana*, and *D. heracleana*, are all more or less common.

Gelechia ericetella.—Abundant on every moor. *G. mulinella*.—Common on furze. *G. diffinis*.—Several, Braid Hills, 1st July; Falkland, 9th August. **G. distinctella*.—A few, Gullane Hill, 14th July 1895. **G. celerella*.—Fairly common, but rather over, Whitberry Point, Tynninghame, 22nd August 1894. *G. confinis*.—One, Aberfoyle, 26th May. *G. terrella*.—Common. *G. politella*.—Longniddry Links, 2nd July. **G. mundella*.—Pettycur, Fife, 4th June 1895. *G. affinis*.—Several, Pettycur, 4th June.

Lita acuminatella.—A few, Drumshoreland, 1st June; one, Boghall Valley, 6th June. *L. artemisiella*.—Frequent. **L. æthiops*.—Common on burnt heather, Bonaly Hill, Pentlands, 13th May 1895. *L. semidecandrella*, Threlfall.—A few, Hedderwick Hill Links and Tynninghame, August 1894. *L. marmorea*.—Abundant among thistles, Luffness sandhills, July. *L. plantaginella*.—Common on *Plantago maritima*, Tyne Estuary, August 1894. *Teleia fugitivella*.—One, Dalkeith Park, 30th July. *T. sequax*.—Several, Arthur's Seat, 22nd July. *T. dodecella*.—Kirknewton, 13th June and 12th August; Newpark, 18th July. **T. triparella*.—One, Aberfoyle, 22nd May. Mr. Barrett is not quite certain that he has identified this correctly, the specimen not being in very good condition.

**Nannodia stipella* (= *næviferella*).—One, Falkland, 9th August 1895.

Brachycrossata cinerella.—Roslin, July; Luffness, 9th August 1896.

**Parasia lappella*.—One, Pettycur, 26th June. **P. metzneriella*.—One, Ormiston, East Lothian, 5th July. **P. carlinella*.—One, Braid Burn path, past Greenbank, 3rd June—all 1895.

Chelaria hübnereella.—Common, Luffness Woods, on birch, September 1892, and also at Gladsmuir, September 1896.

Pleurota bicostella.—Common on Bavelaw Moss, 24th May 1895.

Dasycera sulphurella.—Morningside Park, 26th May.

Ecophora fulviguttella (= *flavimaculella*).—One, Luffness Mill, 16th August 1896. *Æ. fuscescens*.—Gosford, 8th August; Newpark, 18th July. *Æ. pseudospretella*.—Only too common in houses, as is also *Endrosis fenestrella*.

Butalis senescens.—One, Pettycur, 4th June, and another, Luffness Links, 14th July, 1895. *B. torquatella*.—One, in old wood near Kirknewton, 28th May 1895.

Glyphipteryx thrasonella.—Common in damp meadows, Fushiebridge, 6th July; a few, The Bush, near Roslin, 22nd June. *G. fischeriella*.—Very common, May and June.

Argyresthia ephippella.—Common; Dreghorn, Kirknewton, Aberlady, Tynefield. *A. nitidella*.—Very common on hedges, etc.;

- var. *ossea*, Tynefield. *A. semitestacella*.—Common; Gosford, off beech and cedar; Biel, on beech; Falkland. *A. spiniella*.—Belstane, on rowan, plentiful, 26th August 1895. *A. albi-
stria*.—Halls near Penicuik, 7th July; Pettycur, on blackthorn,
plentiful, 8th August, 1894. **A. mendica*.—A specimen,
taken at Dreghorn on 16th July 1889, is referred by Mr.
Barrett to this form. *A. retinella*.—Common on birch;
Dreghorn, Newpark, Winton (off spruce), Blairadam, etc.,
July. *A. curvella*.—Common on apple; Mortonhall, Aberlady,
etc. *A. gadartella*.—Abundant on birch. *A. brocheella*.—
Blairadam, common on birch, 20th July 1895. *A. arceuthina*.
—Pentlands, common on juniper, 5th and 10th June 1895.
- Cedestis farinatella*.—One, near Midcalder, on fir, 29th July; one,
Falkland, 9th August.
- Ocnrostoma piniariella*.—Ravelston, 6th June; common, near
Portobello, on fir, 6th July; Glencorse, 11th May.
- Gracilaria alchimiella* (= *swederella*).—Abundant; swarming on
oaks on Corstorphine Hill in June 1895. *G. elongella*.—Not
uncommon; Gosford, Wemyss, Falkland, August and Septem-
ber; Mortonhall, 27th October; Bridge of Allan, 31st
December; a puzzling variety near Wemyss, 30th May, 1895.
G. tringipennella.—A few, Newpark, 7th June; three, Pettycur,
26th June, 1895. *G. syringella*.—Abundant about privet
hedges. *G. auroguttella*.—A few, Ormiston, East Lothian,
5th July 1895.
- Ornix anglicella*.—Common about hawthorn hedges in May and
June; Hillend, Kames, Greenbank, Balerno, etc. *O. betule*
and *O. loganella* are, Mr. Barrett thinks, both represented
among specimens taken near Kirknewton, at birch, in May and
June 1895. *O. scoticella*.—Newpark, common on rowan,
7th June 1895.
- Coleophora alcyonipennella*.—Greenbank, 24th July; Dalkeith, 30th
July; Pettycur, 4th June. *C. albicosta*.—Common on furze;
Braid Hills, Comiston, Kirknewton, etc. *C. murinipennella*.—
Kirknewton, 23rd and 28th May; Silverburn, plentiful in old
pasture, 27th May; Ormiston, 5th July. *C. caspitiella*.—
Very common. **C. obtusella*, Sta.—Mr. Barrett refers a
specimen obtained among rushes in a damp meadow near
Borthwick to this form. If the identification be correct, the
species is not so strictly maritime as has been supposed.
C. laripennella (*annulatella*).—Craiglockhart, 1st August;
Winton, 4th July; Elie, 23rd July. *C. artemisiella*, Scott.—
One, Pettycur, 8th August 1894. *C. nigricella*.—One, Kirk-
newton, 13th June; one, Newpark, off birch, 18th July. **C.*
vitisella.—Dalkeith, 30th July 1892; Silverburn, 29th June 1894.

Batrachedra præangusta.—One, Luffness, 21st August 1892.

Chauliodes charophyllellus.—Not uncommon; Braid, 9th May; Inverkeithing, 11th April; Biel, 3rd October; East Wemyss, 12th August.

**Laverna lacteella*.—One, Newpark, 17th July; one, Aberlady, 10th July 1895, and another 17th August 1896. **L. ochraceella*.—A dozen, Longniddry Links, at roots of rushes on ditch side, 2nd July 1895. *L. atra* (= *hellerella*).—One, Aberlady, 10th July 1895.

Elachista apicipunctella and *E. albifrontella*.—Both quite common, especially about midsummer. *E. atricomella*.—Bavelaw Moss, Selms Moor, Fushiebridge, June and July. *E. luticomella*.—By Braid Burn, past Greenbank, 30th June 1895. *E. cinereopunctella*.—Two, Drumshoreland, 1st June 1895. **E. stabilella*.—Greenbank, 3rd June; Buckstone, 17th October, 1895. *E. nigrella*.—Near Colinton, 17th July 1893; Kirknewton, June 1895. **E. subnigrella*.—Arthur's Seat, 27th April 1893; Kirknewton, 28th May; Merchiston, abundant about sallows, 30th May, 1895. **E. humilis*.—One, Kingsknowe, 15th June 1895. *E. obscurella*.—Not uncommon; a few, Drumshoreland, Newpark, Westbarns, etc. Specimens of a pale, dirty white form of this species? were taken at Loganlee and Kirknewton in May 1895. *E. rhynchosporella*.—Bavelaw Moss, a good many, 24th June 1895. *E. triatomea*.—A few, Longniddry Links, 2nd July; also at Winton, 4th July 1895. *E. rufocinerea*.—Kames, 9th May; Kirknewton, 28th May; Drumshoreland, 1st June. *E. argentella* (= *cygnipennella*).—Very common.

Tischeria complanella.—Fairly common, Aberfoyle, 23rd May.

Lithocolletis pomifoliella and *quercifoliella*.—Both very common. *L. faginella*.—Dreghorn, Aberlady, etc. *L. spinolella*.—Near Kirknewton, Bowhouse, Winton, on sallows, June and July. *L. scopariella*.—Braid, Roslin, Ormiston, on broom.

Lyonetia clerckella.—Fairly common in garden at Tynefield, East Lothian, August 1894.

Cemiosoma spartifoliella.—Dreghorn, Roslin, Ormiston, July, on broom. *C. scitella*.—Larvæ (from which I obtained specimens of the moth) very abundant in leaves of apple and pear, Aberlady, July 1895.

**Opostega crepusculella*.—One, Luffness Marsh, 10th July; another, 22nd August 1895.

Buccatrix nigricomella (= *aurimaculella*).—Pettycur, common, 6th June; Manuel, 15th June; Kingsknowe Quarry, 15th June.

**B. cristatella*.—Pettycur, a few, 8th August 1894.

- Neptacula anomalella*.—Kirknewton, 23rd May; Greenbank, 3rd June 1895. *N. pygmaella*.—One, Kirknewton, 23rd May 1895. *N. myrtillella*.—Two, Newpark, on bilberry, 7th June 1895. *N. argyropeza*.—Common on aspen, West Wemyss, Fife, 30th May 1895. *N. argentipedella*.—One, Boghall, 10th June; near Kirknewton, common among grass in vicinity of willow bushes, 20th June 1895. *N. graciosella*.—Greenbank, Duddingston, Luffness, etc., on hawthorn hedges. **N. marginicolella*.—One, Aberfoyle, beaten from heather on rock, 21st April 1896. **N. lapponica*?—Boghall, off juniper, 6th June; near Midcalder, off willow, 20th June, 1895. Identification not quite certain.
- Trifurcula immundella*.—Braid Hills, common on furze, 30th June; Tynefield, 18th August, 1894.

ON THE FLORA OF EIGG.

By SYMERS M. MACVICAR.

(Continued from p. 41).

- MYOSOTIS ARVENSIS, *Lam.*—Common.
- MYOSOTIS VERSICOLOR, *Reichb.*—Rather common.
- SCROPHULARIA NODOSA, *L.*—Rare; near cultivation.
- DIGITALIS PURPUREA, *L.*—Generally distributed.
- VERONICA AGRESTIS, *L.*—Field weed near the Hotel. *W. F. M.*
- †VERONICA TOURNEFORTII, *C. Gmel.*—Garden weed at the "Cottage."
- VERONICA ARVENSIS, *L.*—Common in fields.
- VERONICA SERPYLLIFOLIA, *L.*—Roadsides; borders of fields.
- VERONICA OFFICINALIS, *L.*—Scur; also by roadsides and fields.
- VERONICA CHAMÆDRYS, *L.*—Fields.
- VERONICA SCUTELLATA, *L.*—Rare; Cleadale? *W. F. M.*
- VERONICA BECCABUNGA, *L.*—Rare; stream at Laig Bay.
- EUPHRASIA OFFICINALIS, *L.*, var. a *Rostkoviana*, Hayne; *f. borealis*, Townsend.—Common, chiefly in pastures.
- Var. c *gracilis*, Fr.—Common, chiefly on moors.
- BARTSIA ODONTITES, *Huds.*—Locally common as *O. verna*, Reichb.
- PEDICULARIS PALUSTRIS, *L.*—Local.
- PEDICULARIS SYLVATICA, *L.*—Rather common on heaths.
- RHINANTHUS CRISTA-GALLI, *L.*—Rather common.
- Var. *Drummond-Hayi*, F. B. White.—On Cleadale cliffs, at 400-500 ft. alt.

- OROBANCHE RUBRA, *Sm.*—Several plants on a rock near the harbour ; previously gathered there in July 1885, by Mr. A. Somerville, F.L.S. ("Proc. Nat. Hist. Soc. Glasgow," N.S., vol. i. p. lxxvii.).
- PINGUICULA VULGARIS, *L.*—On the moors.
- MENTHA HIRSUTA, *Huds.*—Rare ; Laig Bay.
- MENTHA SATIVA, *L.*—Rare ; Strath.
- (MENTHA ARVENSIS, *L.* ?—Rare ; ditch at side of Laig road.)
- THYMUS SERPYLLUM, *Fr.*—Very common.
- THYMUS CHAMÆDRYS, *Fr.*—Rather common.
- SCUTELLARIA GALERICULATA, *L.*—Uncommon ; on the shore.
- PRUNELLA VULGARIS, *L.*—Common.
- STACHYS PALUSTRIS, *L.*—Locally common.
- STACHYS PALUSTRIS × SYLVATICA (AMBIGUA, *Sm.*)—Roadside above the harbour, with both parents.
- STACHYS SYLVATICA, *L.*—Rather common.
- STACHYS ARVENSIS, *L.*—A not uncommon weed in cornfields
W. F. M.
- GALEOPSIS TETRAHIT, *L.*—*W. F. M.*
Var. *bifida* (Boenn.)—This is here, as elsewhere on this part of the coast, the prevalent form.
- LAMIUM PURPUREUM, *L.*—Weed of cultivation.
- TEUCRIUM SCORODONIA, *L.*—Common.
- PLANTAGO MAJOR, *L.*—The usual form of this plant, very common on roadsides and dry places, is, or approaches, var. *intermedia*, Gilib. Mr. Arthur Bennett said of specimens sent to him, "Seemingly the plant of Gilibert."
- PLANTAGO LANCEOLATA, *L.*—Common.
- PLANTAGO MARITIMA, *L.*—Shores.
- PLANTAGO CORONOPUS, *L.*—Shore, Poll nam Partan.
- LITTORELLA JUNCEA, *Berg.*—Common in hill lochs.
- CHENOPODIUM ALBUM, *L.*—Sides of cultivated fields.
- ATRIPLEX PATULA, *L.*—Laig Bay ? *W. F. M.*
(ATRIPLEX DELTOIDEA, *Bab.* ?—Laig Bay ; specimens immature.)
- ATRIPLEX BABINGTONII, *Woods.*—Laig Bay.
- ATRIPLEX LACINIATA, *L.*—In some quantity at Laig Bay.
- SALSOLA KALI, *L.*—Rather common ; Laig Bay.
- POLYGONUM AVICULARE, *L.*—Common on roadsides, Laig.
- POLYGONUM PERSICARIA, *L.*—Laig.

POLYGONUM AMPHIBIUM, *L.*, forma *terrestre*, Leers.—Laig Bay, with under side of leaves and peduncles glandular. This form I have also gathered on the mainland in Moidart and at Corpach near Fort-William.

RUMEX OBTUSIFOLIUS, *L.*, and RUMEX CRISPUS, *L.*—Sides of fields and waste places.

RUMEX ACETOSA, *L.*—Common.

RUMEX ACETOSELLA, *L.*—Common in dry places.

EUPHORBIA HELIOSCOPIA, *L.*—Rather common in cornfields.

MERCURIALIS PERENNIS, *L.*—Uncommon ; Cleadale.

URTICA DIOICA, *L.*—Common in waste places and on ground manured by frequent visits of animals.

URTICA URENS, *L.*—Side of Scur, with *U. DIOICA*, *L.*, in a sheep-shelter.

MYRICA GALE, *L.*—Moorland near the Manse? *W. F. M.*

(*BETULA*, *sp.*—Extinct. Professor Macpherson told me that he remembers two birch trees on the island ; but that they were cut down by crofters, as the sheep spoiled their wool by rubbing against them. Birch stems are frequently found in the peat mosses.)

CORYLUS AVELLANA, *L.*—Native ; locally common.

QUERCUS ROBUR, *L.*—Native ; grows only a few feet high.

†*SALIX FRAGILIS*, *L.*—A large tree at Cleadale planted about seventy years ago (Professor Macpherson), and plants grown from cuttings from it are in the neighbourhood.

SALIX CINEREA, *L.*—Native ; uncommon ; near Macleod's Cave and the Hotel.

SALIX AURITA, *L.*—Native ; rather common.

SALIX REPENS, *L.*—Very common.

SALIX REPENS × *AURITA* (*AMBIGUA*, *Ehrh.*)—Near the Hotel, with both parents.

†*SALIX VIMINALIS*, *L.*—Planted by Professor Macpherson.

SALIX HERBACEA, *L.*—On the Scur, descending to about 900 ft. alt.

POPULUS TREMULA, *L.*—Native, as stunted plants on Cleadale cliffs.

EMPETRUM NIGRUM, *L.*—Rather common, and fruiting on the Scur.

JUNIPERUS COMMUNIS, *L.*—Uncommon, occurring usually as a prostrate plant. Prof. V. B. Wittrock, to whom I sent specimens from Eigg and other parts of the neighbouring coast, remarked that they were nearer *J. communis* than *J. nana*, but did not agree fully with any Swedish forms that he had seen.

- LISTERA OVATA*, *R. Br.*—One plant only seen, north side of the Scur.
- ORCHIS LATIFOLIA*, *L.*—In fields.
- ORCHIS MACULATA*, *L.*—Fields, banks, and heaths; common.
- HABENARIA CONOPSEA*, *Benth.*—Heaths and pastures.
- HABENARIA VIRIDIS*, *R. Br.*—Rare; bank near Hotel. (Moorland near the pier. *W. F. M.*)
- IRIS PSEUDACORUS*, *L.*—Rather common in patches.
- ALLIUM URSINUM*, *L.*—Rather common among rocks at Strath; occurs also at Cleadale, and beside a stream near the "Cottage."
- SCILLA FESTALIS*, *Salisb.*—Cleadale; beside a stream near the "Cottage."
- NARTHECIUM OSSIFRAGUM*, *Huds.*—Common.
- JUNCUS BUFONIUS*, *L.*—Common on wet footpaths and roadsides.
- JUNCUS SQUARROSUS*, *L.*—Common on moors.
- JUNCUS GERARDI*, *Loisel.*—Shore, Poll nam Partan.
- JUNCUS EFFUSUS*, *L.*—Common.
- JUNCUS CONGLOMERATUS*, *L.*—Common.
- JUNCUS SUPINUS*, *Mærch*, var. *Kochii*, *Bab.*—Common.
- JUNCUS LAMPROCARPUS*, *Ehrh.*—Common.
- JUNCUS ACUTIFLORUS*, *Ehrh.*—Common.
- LUZULA MAXIMA*, *DC.*—Cleadale cliffs; cliffs at Macleod's Cave.
- LUZULA ERECTA*, *Desv.*—Common.
- TRIGLOCHIN PALUSTRE*, *L.*—Common.
- TRIGLOCHIN MARITIMUM*, *L.*—Poll nam Partan.
- POTAMOGETON POLYGONIFOLIUS*, *Pour.*—Rare; stream, Laig Bay; ditch near the Schoolhouse. (Shallow pool on shore near Macleod's Cave. *W. F. M.*)
- ZOSTERA MARINA*, *L.*, var. *angustifolia*, *Fr.*—Near the harbour. *W. F. M.*
- ELEOCHARIS PALUSTRIS*, *R. Br.*—Common in hill lochs.
- ELEOCHARIS MULTICAULIS*, *Sm.*—Rare?
- SCIRPUS PAUCIFLORUS*, *Lightf.*—Rather common; Poll nam Partan; Laig road.
- SCIRPUS CÆSPITOSUS*, *L.*—Moors.
- SCIRPUS SETACEUS*, *L.*—Rare; near Macleod's Cave.
- SCIRPUS RUFUS*, *Schrad.*—Poll nam Partan.
- ERIOPHORUM VAGINATUM*, *L.*—Moor near the Scur.
- ERIOPHORUM ANGUSTIFOLIUM*, *Roth.*—Common.

- SCHÆNUS NIGRICANS, *L.*—Shore at Poll nam Partan.
- CAREX DIOICA, *L.*—Not many plants seen.
- CAREX PULICARIS, *L.*—Laig Bay.
- CAREX ARENARIA, *L.*—Common on sandy shore, Laig Bay.
- CAREX VULPINA, *L.*—Very rare ; Laig Bay.
- CAREX ECHINATA, *Murr.*—Common.
- CAREX OVALIS, *Good.*—Uncommon.
- CAREX GOODENOWII, *J. Gay.*—Generally distributed.
- CAREX FLACCA, *Schreb.*—Rather common, especially near the shore ;
Mr. Arthur Bennett remarked on a specimen from Strath cliffs :
“ Approaching in habit to var. *stictocarpa*.” (*Forma flavesces*,
near Musical Sands. *W. F. M.*)
- CAREX PILULIFERA, *L.*—Scur ; glumes frequently awned.
- CAREX PALLESCENS, *L.*—Uncommon ; occurs with both crimped
and plain bracts.
- CAREX PANICEA, *L.*—Common ?
- CAREX BINERVIS, *Sm.*—Common ; also grows on Cleadale and
Strath cliffs.
- CAREX FLAVA, *L.*—Common ; this plant, with *Festuca ovina*, *L.*,
forms the greater part of the scanty covering of the upper
Scur ridge.
- CAREX ROSTRATA, *Stokes.*—Rare ; ditch near Schoolhouse ; Laig
Bay.
- PHALARIS ARUNDINACEA, *L.*—Rare.
- ANTHOXANTHUM ODORATUM, *L.*—Common.
- ALOPECURUS GENICULATUS, *L.*—Common ?
- ALOPECURUS PRATENSIS, *L.*—Rare ; sides of cultivated fields.
- AGROSTIS CANINA, *L.*—Rather common.
- AGROSTIS PALUSTRIS, *Huds.*—Common.
Var. *maritima*, *Mey.*—Laig Bay.
- AGROSTIS VULGARIS, *With.*—Common. The dwarf state, infected
with a fungus, also occurs in dry places.
- AMMOPHILA ARUNDINACEA, *Host.*—Sandy shore, Laig Bay ; Poll nam
Partan. I was told that this had been introduced to the
former place by a farmer some years ago, my informant showing
me a specimen that he himself had introduced on to the main-
land ; but as he thought that *Elymus arenarius* was the same
species, and as this latter plant also grows at Laig Bay, it is
probably the one introduced into Eigg, since *Ammophila*
occurs also in another part of Eigg, which my informant was
unaware of.

AIRA CARYOPHYLLEA, *L.*—Rare ; roadside near the Hotel.

AIRA PRÆCOX, *L.*—Uncommon ; roadside near the Hotel.

DESCHAMPSIA CÆSPITOSA, *Beauv.*—Common ; also occurs on Cleadale cliffs.

DESCHAMPSIA FLEXUOSA, *Trin.*—Common.

Var. *montana*, Hook. fil.—On Cleadale and Strath cliffs ; on the Scur a slightly different form occurs, with panicles very silvery.

HOLCUS LANATUS, *L.*—Common ?

AVENA PUBESCENS, *Huds.*—Rare ; Cleadale.

ARRHENATHERUM AVENACEUM, *Beauv.*—Uncommon ; Cleadale cliffs ; Laig Bay, with both flowering glumes equally awned ; occurs also with *Avena pubescens*, with pubescent sheaths ; Mr. Arthur Bennett, who saw a specimen, remarked : "I can find no mention of such a form."

Var. *nodosum*, Reichb. — More common than the type ; Cleadale.

SIEGLINGIA DECUMBENS, *Bernh.*—Common.

CYNOSURUS CRISTATUS, *L.*—Rather common.

KOELERIA CRISTATA, *Pers.*—Generally distributed ; common in places.

MOLINIA VARIA, *Schrank.*—Common ?

CATABROSA AQUATICA, *Beauv.*, var. *littoralis*, Parn. — Musical Sands. *W. F. M.*

DACTYLIS GLOMERATA, *L.*—Common.

POA ANNUA, *L.*—Common.

POA NEMORALIS, *L.*—Very rare ; Strath cliffs ; "of the varieties described by Syme, this seems to come between *coarctata* and *glauantha*" (Arthur Bennett).

POA PRATENSIS, *L.*—Common.

POA TRIVIALIS, *L.*—Uncommon.

GLYCERIA FLUITANS, *R. Br.*—Rare.

FESTUCA OVINA, *L.*—Very common.

FESTUCA RUBRA, *L.*—Scur ; Cleadale ; Strath.

Var. *pruinosa*, Hackel (*teste* Arthur Bennett).

FESTUCA ELATIOR, *L.*—Rare ; shore ; Poll nam Partan.

BROMUS MOLLIS, *L.*—Roadsides near cultivation.

BRACHYPODIUM GRACILE, *Beauv.*—Rare.

LOLIUM PERENNE, *L.*—Common near cultivation.

AGROPYRON REPENS, *Beauv.*—Sandy shore, Laig Bay.

Var. *barbatum*, Duval-Jouve.—Sandy shore, Laig Bay ; not seen as a weed of cultivation.

AGROPYRON ACUTUM, *R. and S.*?—Sandy shore, Laig Bay.

AGROPYRON JUNCUM, *Beauv.*—Sandy shore, Laig Bay.

NARDUS STRICTA, *L.*—Common.

†? ELYMUS ARENARIUS, *L.*—See remarks on *Ammophila arundinacea*.

PTERIS AQUILINA, *L.*—Common.

(†CRYPTOGRAMME CRISPA, *R. Br.*—A lady told me that she had planted this on the Scur. I did not meet with it there.)

LOMARIA SPICANT, *Desv.*—Common.

ASPLENIUM ADIANTUM NIGRUM, *L.*—Rather common.

ASPLENIUM MARINUM, *L.*—Rocks near Macleod's Cave.

ASPLENIUM TRICHOMANES, *L.*—Scur.

ASPLENIUM RUTA-MURARIA, *L.*—Rocks, Poll nam Partan.

ATHYRIUM FILIX-FÆMINA, *Roth.*—Common.

SCOLOPENDRIUM VULGARE, *Symons.*—Rare ; rock clefts near Musical Sands.

CYSTOPTERIS FRAGILIS, *Bernh.*—Plentiful on side of Scur ; Cleadale.

POLYSTICHUM LOBATUM, *Presl.*, var. *aculeatum*, *Syme.*—Rare ; Cleadale cliffs.

LASTRÆA OREOPTERIS, *Presl.*—Common.

LASTRÆA FILIX-MAS, *Presl.*—Plentiful on the side of Scur.

LASTRÆA DILATATA, *Presl.*—Side of Scur.

POLYPODIUM VULGARE, *L.*—Side of Scur.

PHEGopteris POLYPODIODES, *Fee.*—Side of Scur.

(†OSMUNDA REGALIS, *L.*—A lady informed me that she had introduced this. I did not see it.)

(BOTRYCHIUM LUNARIA, *Sw.*—I was told that this grows in a field near the Manse. My informant is familiar with the plant.)

EQUISETUM ARVENSE, *L.*, also var. *decumbens*, Meyer, *teste* Arthur Bennett, who wrote: "Your specimens are much larger than my Danish ones." This form, apparently not hitherto noted for Britain, grows on the sands of Laig Bay. I have gathered a plant in Skye which seems intermediate between this and the common decumbent form of *E. arvense*.

EQUISETUM SYLVATICUM, *L.*—Laig Bay.

EQUISETUM PALUSTRE, *L.*—Ditch at side of Laig road.

(EQUISETUM LIMOSUM, *Sm.*?—This requires confirmation.)

LYCOPodium SELAGO, *L.*—Rare ; summit of Scur ridge.

SELAGINELLA SELAGINOIDES, *Gray.*—Rather common.

ISOETES LACUSTRIS, L.—Rare; small loch at the summit of Scur ridge, a few plants.

CHARA FRAGILIS, Desv.—Rare; ditch above the "Cottage."

To the above must be added a *Hieracium* gathered on the Scur by Mr. Miller, who tells me that it is a small plant not much like typical *H. argenteum*, Fr.; but that Mr. Hanbury said of it: "This agrees with a plant from the Hebrides marked *H. argenteum*, modif., in the Herbarium" (Boswell Syme's?).

Epilobium adnatum, Grisebach, must be deleted. Rev. E. S. Marshall, to whom I have sent a specimen since the above was in print, has named it *E. obscurum*, Schreb.

The following, inadvertently omitted, are to be included, viz. :—

CHRYSANTHEMUM SEGETUM, L.—Very common in cornfields; has spread to roadsides and waste places.

CHRYSANTHEMUM LEUCANTHEMUM, L.—Banks near the Hotel.

NEW AND RARE SCOTTISH MOSSES.

By Dr. J. STIRTON, F.L.S., etc.

CAMPYLOPUS FUSCOLUTEUS (published 1865) is distinguished by the compact tufts, with abundance of red or, in older specimens, brown tomentum, which ceases rather suddenly a little below the long, somewhat spreading apical leaves. The nerve is very broad, two-thirds or even three-fourths the breadth of the leaf near the base, with the usual broad pellucid cells next the nerve, and very narrow cylindrical cells near the margin; the upper cells are small and quadrangular. A section of the nerve reveals an anterior layer of largish pellucid cells; two intermediate rows of small dark cells, and an outer row of large bullate projecting, pellucid cells. The alar cells are scarcely developed, but larger cells with a tinge of red are often seen next the nerve, and this red colour is frequently seen for a considerable distance up the side of the nerve. Ben Voirlich, 1864.

CAMPYLOPUS SYMPLECTUS (described 1887) is distinguished from *C. fuscoluteus* by the pale or pale brownish

dense tufts with only a few pale radicles. The nerve is equally broad, and the pagina ceases in the lowest fourth of the leaf. The areolation near base is smaller than in *C. fuscoluteus*, although there are the usual narrow cells near the margin. Alar cells scarcely developed, not more so than in *C. compactus*, while in some specimens there can scarcely be seen any alar spaces. There are no hair-pointed apices to the leaves. A section of the nerve reveals two anterior rows of pellucid cells, those of the inner row being usually smaller, one row of small dot-like cells and an outer layer of prominent (diam. often .009 mm.), bullate cells with thickish walls, containing apparently chlorophyll to a small extent. Benbecula, 1885.

DICRANUM EXPALLIDUM.—Stems densely cæspitose, scarcely, if at all, radiculose, one to two inches in height, whitish pale or pale fuscous, upwards greenish-glaucous, sparsely ramulose; leaves ovate lanceolate acuminate, narrowed somewhat at the base; nerve a little up from the base one-third breadth of the leaf, seldom broader; cross section of nerve shows a row of pellucid cells in front, next to this another row of small opaque cells, behind these a row of pellucid cells, while on the posterior aspect a row of bulging largish pellucid cells. At base are often two or three rows of largish yellow or orange cells much as in *Dicranum*. This group, in the majority of the specimens, is apt to remain on the stem when the leaf is detached from it. Central basal cells large oblong pellucid, towards margin narrower, near margin very long and narrow, about the middle of the stem small, quadrate; apex of leaf toothed, and often teeth (pellucid or at times greenish) are seen down the margins as well as on the back. Capsule ovate, a little bent, on a stout, straight seta.

This moss seems more allied to *Dicranum albicans* than to the *Campylopi*.

These three mosses must be associated with *C. subulatus*, and, if I had not secured tufts of the latter fully an inch long, having leaves, as regards length, etc., as described by Dr. Braithwaite, I might have been tempted to put down *C. subulatus* as a stunted, undeveloped condition of one or other of them.

CAMPYLOPUS PELIDNUS (described 1887).—Similar to *C. atrovirens*, but with stems stronger, shorter, and the leaves more closely set and somewhat spreading. Leaves not hair-pointed, but with several pellucid teeth at apex. No auricles, but only very rarely small spaces at base composed of cells with thin walls such as may be seen in other non-auricled species. A section of the leaf reveals three nearly equal rows of cells with thick walls, here and there translucent in the centre. Nerve about one-third the breadth of the leaf near the base; upper cells long, rhomboid, dark, containing nuclei and much granular matter. Benbecula, 1885.

CAMPYLOPUS SHAWII assumes many forms, and it has as varied aspects. One specimen, on a large scale, with abundance of red (not brown) tomentum giving the moss the appearance of some aspects of *C. flexuosus*, I have named the variety *rufulus*. In the specimen before me the leaves are denticulate at apex as well as considerably down the margins. The nerve is about one-half the breadth of the leaf near the base. Auricles in young leaves colourless, large, and hollow; in older leaves wine coloured, large, extending right across to the nerve, suggesting in this respect also *C. flexuosus*. Benbecula, 1885.

CAMPYLOPUS BREVIPILUS, *var. ATTENUATUS*, differs from the type in the long slender stems, two to four inches in length, not showing the fasciculated innovations of the leaves, but merely slight interruptions indicative of renewed growth, quite as in the other species; leaves not hair-pointed, with involute margins (almost touching), and not reflexed so far as can be seen; no auricles, but merely here and there small pellucid spaces composed of cells with thin walls; upper areolation longer and more slender, $.035 - .05 \times .004 - .006$ mm. A section of the nerve shows two to three rows of dark small points, at times irregularly disposed, but without the intermediate pellucid cells. Unst, Shetland, 1886.

In deference to two botanical friends, I have agreed, meanwhile, to allow this moss to remain as a variety, mainly because neither they nor I have completed investigations into the structure of the nerve.

BARBULA EXIGUELLA.—Synoicous. In lax tufts, pale green above, fuscous below, slightly radiculose, short, about $\frac{1}{4}$ inch in height. Leaves distant below, very small, sub-erect, upper much longer, and crowded in a patulous coma, from a longish sheathing, white, thin base, lanceolate, pale green or glaucous, when dry arcuato-incurved ; wings concave, incurved, sloping upwards rather suddenly towards the nerve ; nerve stout, bent upwards near the apex, so that the leaf there is somewhat boat-shaped or cucullate, excurrent in a longish mucro, prominent beneath, smooth, pale ; cells at base hyaline, lax, rectangular, ceasing transversely, gradually becoming smaller and ending in the roundish-quadrate, small chlorophyllose cells, papillose on both sides, and margin crenulate from projecting cells. Perichæatial leaves of laxer texture, the inner composed of a larger proportion of hyaline cells. Setæ pale or yellowish, straight, very numerous ; capsule not formed.

I have only on two occasions seen antheridia nearly in apposition to a germinating archegonium.

On the ground in open fields, Mainland, Orkney, August 1887 ; plentiful.

BARBULA AGGREGATA.—Stems rather densely, at times laxly, aggregated, from one to one and a half inch in height, stout, sparsely and shortly branched above ; leaves thickly set on the stem, when dry circinnately incurved, nearly straight when moistened, lanceolate, scarcely acuminate, fragile ; pagina incurved upwards, sloping towards nerve pretty suddenly at the acute apex ; nerve smooth on back and pale, somewhat glistening, extruded in a short acute mucro ; areolation at base as in that of *B. tortuosa*, sloping upwards to margin at a very acute angle, and prolonged in all the lower leaves as a single row of small smooth cells to apex, so that the margin is smooth ; apical leaves, crenulate in upper half ; rest of the areolation dense, opaque, and minutely papillose. On sandy soil near the sea, Harris, 1886.

BARBULA CIRRHIFOLIA (*Sch.*) is recorded here because it was discovered by me on Ben Lomond in 1863, the only Scottish station at that time. A specimen was sent to Professor Schimper. This is *Mollia hibernica* (*Mitt.*), Braith.

GRIMMIA RETRACTA (published 1885), *var. SUBMUTICA*.—*Gr. retracta* is easily recognised in the field by its light green patches, whose leaves remain permanently squarroso-recurved during wet weather, while those of *Gr. Hartmani* under the same conditions become flaccid, and cohere in little groups in an upward direction. The variety *submutica* is of a somewhat darker colour, while the leaves in some patches are all without hair points, in others, a very short hair point is occasionally seen. Achnacarron, Loch Awe, 1896.

BRYUM RUBRICOSUM (published 1867).—Densely tufted, radiculose, one to three inches in height, red below, green near summit, above sparingly and fastigately branched. Stems red, thickish; leaves rather distantly placed, small, about $1.4 \times .8$ mm., concave, obovate (narrowed a little at base), rounded at apex, reflexed on margin almost throughout; nerve solid, red, tapering upwards and excurrent in a short straight sharpish mucro, at times ceasing just below apex, but the leaf still a little pointed; areolation lax, oblong below, $.05 \times .019$ mm., a little smaller above and more hexagonal. Leaf not bordered nor thickened, margin composed of one, occasionally two rows of cells, slightly narrower than the others, viz. $.013$ mm. in breadth. Near the summit of Ben Lawers, 1864.

In August of 1887 there was picked up, near the shores of Loch Harray in Orkney, a *Philonotis* which attracted my attention. An examination of the moss lately showed it to be *P. rigida* (Brid.). This is the only record of the moss for Scotland, and probably the most northern station for it in Europe. Curiously enough, near it grew *Alectoria bicolor*, enveloping a tuft of *Calluna*—an unusual habitat for this lichen, and one not many feet above sea-level. On the Ward Hill of the Mainland, Orkney, at an elevation of not more than 150 feet above the sea-level, I secured two mosses growing nearly in apposition, viz. *Sphagnum medium* (Limpr.) and *Bryum Duvalii* (Voit). I may revert to the shores of Loch Harry as the habitat of several good things, and notably as to the curious distribution there of *Primula scotica*.

In September of 1896, near Loch Awe, I picked off

the bark of a rather young poplar, at a height of six feet from its base, a curious variety of *Hypnum triquetrum*, whose leaves are undulated transversely much as in *Dicranum undulatum*, or as in those of *Neckera pumila* (Hdw.), which grew in apposition to it, or, indeed, intermingled with it. Apart from the unusual habitat, the appearance of the moss differs from the common form inasmuch as the branching is irregular and not pinnate, while the short branches are not deflexed nor attenuated. An examination of the leaf under the microscope revealed near the base areolation larger and more separated; while, in the same region, the cells appeared to communicate with each other by lateral and, occasionally, by apical pores. There were seen, besides, one or two rows of large red cells quite at the base, which often extended right across. Neither of these peculiarities have I observed in normal specimens, but merely at times yellowish cells near the nerves. Meanwhile I distinguish this variety by the name *corrugatulum*.

ZOOLOGICAL NOTES.

A Supposed Instance of the Occurrence of the Wild Cat in Midlothian.—When I wrote my “Mammalian Fauna of the Edinburgh District” I was unable to cite a single record of the occurrence of the Wild Cat in Midlothian, but pointed to the banks of the Esk as a locality in which it was just possible a few might have lingered till the opening years of the present century. Not long after, namely, in October 1892, Mr. Thomas Gordon, Banker, Edinburgh, informed me that his father, who lived at Temple, shot a “Wild Cat” at Arniston on the southern branch of the Esk in 1830, and that its stuffed skin remained in the family till a few years ago, when it was destroyed. I suggested that perhaps it was only a domestic cat run wild, but this Mr. Gordon would not admit; and certainly his description of it was quite in keeping with that of the present race of Scottish Wild Cats.—WILLIAM EVANS, Edinburgh.

Marten in Sutherland and Inverness-shire.—Messrs. Mackay received a Marten (*Mustela martes*), a very fine specimen, from Mr. D. Morrison, Scourie, Sutherland, on 12th January 1897; and another equally fine from Kenneth Kennedy, Inverie, Knoydart, Inverness-shire, on 11th February.—T. E. BUCKLEY, Inverness.

Badgers in Lanarkshire.—Referring to the Badger (*Meles taxus*) recorded from Lanarkshire in the "Annals" for October 1896, I have been informed since sending that note that other two, male and female respectively, have been taken in the same locality, Jock's Gill, a deep ravine on the right bank of the Clyde, separating Milton-Lockhart from Mauldslie Castle. The history of the female, taken in the autumn in poachers' nets, is somewhat obscure, which is not surprising in view of the circumstances of its capture; but the male was trapped towards the end of January by the keeper at Milton-Lockhart, and was preserved by my friend Mr. Drummond Pringle, Chapel, Braidwood. I am again indebted to Mr. Robert M. Morton for communicating the information regarding these Lanarkshire Badgers, and from the inquiries which that gentleman has made it appears that those in the neighbourhood referred to who are most likely to know of any introduction cannot speak to such, and are unable to account for their appearance. It will be remembered that three were got on the Dolphinton estate, Lanarkshire, in the two or three years preceding 1891 ("Scot. Nat.," vol. v. N. S. p. 36).—JOHN PATERSON, Glasgow.

Great Tit in Sutherland.—This is at all times an uncommon species anywhere north of the Kyle of Sutherland. In December 1895 a Tit was seen at Kintradwell by Mr. Houstoun, which, from his description, was evidently a Great Tit (*Parus major*). It appeared along with other species of Tits and Creepers. On 19th December 1896 I saw a single Great Tit on the road between Spinningdale and Bonar Bridge, and this is the first actual specimen I have ever seen in the county of Sutherland.—T. E. BUCKLEY, Inverness.

The Scaup Duck on Fresh Waters.—This bird is stated by all authorities to be almost exclusively marine in habit. I am inclined to think it is often overlooked among Tufted Ducks, with which it usually consorts, and which it closely resembles on the water at a distance. The male bird of each shows black and white, and it is only through the glass that one is able to identify the Scaup drake by his silvery gray back, and white instead of yellow irides. The ducks of both species are very similar in general appearance, until with age the female Scaup acquires the characteristic ring of white feathers on the face round the bill. Scaup (*Faligula marila*) regularly frequent the lake sanctuary at Monreith, which is rarely without one or more pairs in winter.—HERBERT MAXWELL.

Baillon's Crake in West Renfrewshire.—In the middle of May 1893 an example of this Crake (*Porzana bailloni*), which had met its death through coming in contact with telegraph wires, was picked up in Lochwinnoch parish, Renfrewshire, by a Mr. Whitelaw. Not knowing what the bird was, its possessor submitted it to Messrs. Matthew Barr and John Craig, joint authors of a list of the birds of the Ayrshire parish of Beith, adjoining Lochwinnoch, and

it was identified by them as Baillon's Crake. Mr. Whitelaw probably did not understand its value, and he exchanged it with Mr. F. W. Pape, Bolton, for some birds' eggs. It was acquired by the Chadwick Museum, Bolton, from Mr. Pape, with other birds, in the same year (1893), and I am indebted to Mr. Thomas Midgley, the assistant curator there, for kindly sending it to me for examination. It is usually stated that but two examples of this species have occurred in Scotland, and these are old records, but Mr. Macpherson in his "Introduction to the Study of British Birds" (1891) says he "can answer for a third, caught by a dog near Stranraer."—JOHN PATERSON, Glasgow.

Solitary Snipe in the Solway District.—A fine specimen of this rare species, which had been shot not far from Crocketford on 2nd October, was sent me for identification. It weighed $7\frac{1}{2}$ ozs. when it came to me, but the previous day it had weighed a quarter ounce more. The bird was extremely fat, and proved on dissection to be a young male. The stomach contained some moss and other vegetable fibres unknown, one small caddis worm, one little red earthworm, several white aquatic worms, and one single larva, evidently lepidopterous. So far as I know, this is the first time the occurrence of the Great Snipe (*Gallinago major*) in Dumfriesshire or Galloway has been thoroughly authenticated. There is, however, a record in the old files of the *Courier* for 29th September 1818 of an extra large Snipe that I have no doubt was really a specimen of the Solitary Snipe. The paragraph is of interest in the present connection, and runs as follows:—"As two gentlemen were shooting at Barnsoul on Thursday last, a remarkably large snipe rose before them, at which, in order to make sure, they both fired, and brought it down. It proved to be of the most beautiful plumage, and of the following weight and dimensions, viz. 8 ounces in weight, and measured from tip to tip of the wings $19\frac{1}{2}$ inches, and in length from the tip of the bill to the end of the tail $15\frac{1}{2}$ inches."—R. SERVICE, Maxwelltown.

Greenshank and other Birds in West Lothian.—On 4th February I picked up a Greenshank (*Totanus canescens*) in a sadly mutilated condition at the side of Port Edgar in West Lothian. On 4th to 6th February I counted seventy-nine dead birds in portions of the West Lothian and Fife shores, the most interesting of which, next to the Greenshank, was the Little Auk (*Alca alle*), of which I found ten individuals.—ROBERT GODFREY, Edinburgh.

The Curlew Sandpiper and Marsh Tit in East Renfrewshire.—We are able to add the two species named to the list of East Renfrewshire birds. In September 1895 we saw two or three waders, which we suspected to be Curlew Sandpipers (*Tringa subarquata*), but they flew off, and gathering darkness made further search useless. On 19th September 1896, however, we were pleased to

have our suspicions confirmed regarding the appearance of this species at this season, by seeing two of them at Waulkmill Glen Reservoir; and on the following day, at Balgray, less than a mile distant, we heard the somewhat musical *threep* of this species, and saw two (probably the birds of the previous day) detach themselves from a small flock of waders which were skimming across the waters. The Marsh Tit (*Parus palustris*) has been seen on thirteen occasions between 7th November 1896 and 14th February 1897 in the Giffnock district. Comparatively numerous at one time during that period, it has disappeared since the last-named date, but we hope only temporarily. Its characteristic "*chay, chay*," is sometimes so shaky as to resemble the buzzing of a humble-bee entangled in grass.—JOHN PATERSON and JOHN ROBERTSON.

Gray Phalarope in the Solway District.—A remarkably early instance of the occurrence of this scarce species in the district is an example shot on the Nith near to Kelton on 19th September last, which came into my hands shortly afterwards. As usual, the bird was very tame, and was easily procured as it swam near to the river edge. The specimen is a rather small male. I have an impression that the Gray Phalarope (*Phalaropus fulicarius*) only finds its way to our area after strong north-westerly winds. For some days previous to the capture of this particular bird there had been very strong winds from N.N.W.—R. SERVICE, Maxwelltown.

Little Gull on the West Coast of Scotland.—Considering the comparative rarity of *Larus minutus* in Western Scotland, it is interesting to notice the relative frequency with which this species has visited the Solway Firth of recent years. In 1893 a bird of the year was shot on Rockliffe Marsh on the 28th of October. Another was shot near Annan in January 1894. A very interesting bird, in changing plumage, was shot near Silloth in June 1894. I received several reports of a Little Gull being seen by different observers on the Eden at Carlisle in January and February 1895. A Little Gull in nest feather was shot on the north side of the Esk, opposite Rockliffe Marsh, on the 16th of September 1896. Lastly, another young bird, which retains much of the brown nest plumage on the upper parts, was obtained near Allonby on the 9th of October 1896. This last specimen was shot by Mr. Thomas Mann, who kindly insisted upon my accepting it. I had previously purchased the other four specimens, and added them to the public collection of *Aves* in the Carlisle Museum. A record of our local occurrences of *Larus minutus* prior to 1893 will be found, I believe, in the "Fauna of Lakeland." This note brings the record up to date.—H. A. MACPHERSON, Allonby Vicarage, Cumberland.

Little Auks in the Forth.—The Little Auks (*Mergulus alle*) have again been driven on our shores, but apparently not in any-

thing like such numbers as in the beginning of 1895. The first I heard of them was from Mr. D. Bruce, Dunbar, who reported one found in an exhausted state on the railway embankment near there on 15th January; others were seen just off the town the same day. On 3rd February he again wrote me to say that the fishermen reported large numbers in the mouth of the Firth between St. Abb's and Fife Ness; also that on the previous day he had three specimens brought to him, and had heard of others being got at Spott and other inland localities. On 1st February one was found at Aberlady and taken to Mrs. Bryden; and about the same date two were shot close to Portobello Pier. On 19th February I saw altogether thirty-one in the hands of the city taxidermists: most of these specimens had been "sexed," and with one exception were females.—WILLIAM EVANS, Edinburgh.

Little Auk in Renfrewshire.—Mr. John Lang, Greenock, has kindly sent me word that a Little Auk (*Alca alle*) was picked up dead on 6th February this year near the Cloch Lighthouse.—JOHN PATERSON, Glasgow.

Vertigo substriata in Midlothian.—On 8th ult. (March 1897) I found a fresh specimen of this tiny shell on a patch of damp moss (*Mnium punctatum*) in Dreghorn Valley, Pentland Hills, near Edinburgh. I do not think the species has previously been reported for the county. The specimen has been submitted to Mr. J. W. Taylor, F.L.S., for "authentication."—WILLIAM EVANS, Edinburgh.

A New Station for the Water Spider.—*Argyroneta aquatica* has been found at the Braid Hills in the course of the investigations which are being carried on at the ponds there by Mr. T. Scott, F.L.S., F.Z.S., and myself. This station is the pond at the southern side of the Braids known as the Elf Loch. About 1885 two members of the Edinburgh Field Naturalists' Society, Messrs. Archibald Gray and A. B. Herbert, found this interesting spider—the one at Luffness, the other at Bavelaw. Mr. Herbert then predicted that it would yet be found nearer the city, and now two members of the same Society have discovered it to be present in the loch above mentioned.—JOHN LINDSAY, Edinburgh.

Noctua depuncta and Mania maura and its vars. in Roxburghshire.—When sugaring some trunks here for *Noctua* in the beginning of August last, I took a specimen of *Noctua depuncta* on a trunk of spruce fir, settled amongst other common insects such as *G. Pronuba*, *X. Polyodon*, etc. Mr. C. G. Barrett has seen the specimen, and notes this as a new locality for it. *Mania maura* at same time was not uncommon on the trunks, and I took eleven fine specimens, including the coppery-brown coloured variety, and another intermediate between the typical form and it, with the orbicular and reniform spots having a distinctly paler outline, and

also the marginal index of hind wings; and the blotch or spot at apical angle of fore wings being much lighter in colour and more distinctly defined.—A. ELLIOT, Caverton, Roxburgh.

Daetylocotyle palmatum (*Leuchart*) in the Moray Firth.—A few specimens of this curious Trematode were obtained on the gills of a Ling (*Molva vulgaris*) caught in the Moray Firth last November. This leech-like parasite does not appear to be very common; I do not know of any previous Scottish record for it. The anterior end is obliquely two-lobed, and each lobe terminates in four finger-like appendages: the lobes are opposite each other, and grasp the gill-arch much the same as an object is grasped by the fingers and thumb of the human hand.—THOMAS SCOTT, Leith.

Rhincalanus gigas, *Brady*, in the Moray Firth.—A specimen of this Copepod was captured in the Moray Firth, off Nairn, on the 16th of October last. So far as I know, this is only the third time *Rhincalanus gigas* has been recorded as having been found in the Scottish seas: it was first obtained in some tow-net material from Orkney collected in 1889, and in February of the following year I obtained the same species twenty-two miles south-east of Montrose.—THOMAS SCOTT, Leith.

Eucalanus crassus, *Giesbrecht*, in the Moray Firth.—A specimen of this Copepod was obtained in the same gathering of tow-net material collected off Nairn in which *Rhincalanus gigas* occurred. There is no previous record of *Eucalanus crassus* from the East Coast of Scotland.—THOMAS SCOTT, Leith.

Asterocheres violaceus (*Claus*) from the Firth of Clyde.—Quite recently I obtained two specimens of this somewhat rare species in some material collected last year off Pladda Island, Firth of Clyde. The species has not before been recorded from Scotland, but my son (who has published a description, with drawings, of the species) has recorded it from the Irish Sea (see Giesbrecht's Revision of the *Ascomyzontida*, published in "Zoologischer Anzeiger," Nos. 521 and 522, 1897).—THOMAS SCOTT, Leith.

BOTANICAL NOTES AND NEWS.

Scotch Euphrasie.—Dr. von Wettstein of Prague, who has recently published a monograph of the genus *Euphrasia*, has kindly looked over a few of my specimens gathered in Scotland. They include the following, which are described as species in the monograph alluded to:—

Euphrasia curta, Fries ("Nov. Fl. Suec." (1828), ed. ii. p. 198,

pro var. Wettst. "Mon. Euph." (1896), p. 228).—I gathered this pretty small form near Invercauld, South Aberdeenshire, in June 1896.

E. gracilis, Fries ("Mantissa," iii. p. 62).—Invercauld in South Aberdeen; near Strathpeffer in East Ross; Ben Lawers, Mid-Perth.

E. brevipila, Burnat et Gremli (*ex*. Townsend in "Journ. Bot." (1884), p. 167).—In several places about Braemar, South Aberdeenshire, 1896.

E. borealis (Townsend) Wettst. ("Mon. Euphrasia" (1896), p. 108).—Applecross, Ullapool, Dundonell, etc., in West Ross; Glen Spean in Westerness; Kingussie in Easterness; near Loch of Spynie in Elgin.

E. Rostkoviana, Hayne ("Arzneig." ix. (1823), t. 7).—Ben Lawers, in Mid-Perth.—G. CLARIDGE DRUCE.

[In **Highland Plants collected in 1896** ("Journal of Botany," March 1897. Messrs. Marshall and Shoolbred record the following Euphrasiæ:—" *E. Rostkoviana* Hayne and *E. gracilis* Fr. are frequent about Glen Roy; *E. scottica* Wettst. (*E. paludosa* Townsend, non R. Br.) is also plentiful, and ascends to fully 2000 feet, preferring wet, grassy, or sedgy spots."]

Scotch Carices—*Carex adocarpa*, Anderss., "Plantæ Scandinaviæ" (1849), p. 25, as a sub-species of *C. Oederi*, Ehrh. Calam. n. 79. *C. Oederi* (Ehrh. Cal.), Hoffm., "Deutsch. Fl.," var. *adocarpa* (And.), Hartm., "Hand. Skand. Fl." (1879), p. 459: "Spica masc. valde pedunculata, fem. ovatis-globosis remotis, fructibus nervis acutioribus rostroque evidentiori, recto, bracteis erecto-patentibus; culmis decurvis. In Roslagia (ad Rånäs) tantum observavi." "Flora Danica," t. mmccxciv., Exs. Herb. Norm., f. 13, n. 83: "Differt a speciei forma typica spica mascula longius pedunculata, foemineis ovalibus vel globoso-ovatis, inter se remotis, bracteis erecto-patentibus, perigynii rostro magis conspicuo recto, nervis magis prominulis." I gathered this sedge near Loch-an-Eilan, Easterness, as noted in the "Scottish Naturalist" for 1888, p. 330.

C. canescens, Linn., "Sp. Pl." (1753), p. 974, var. *tenuis*, O. F. Lang in "Linnæa" (1851), xxiv. p. 538: "Tota valde gracilis et debilis habitum fere referens Caricis Persoonii. Spiculæ paucifloræ. Hujus memorabilis formæ cæspitem circiter culmorum octodecim in consortio normalis plantæ prope Erlangam quondam legi." In the year 1888 I found this variety in Glen More, Easterness. I owe the identification to Dr. Lange of Copenhagen. I had placed it in my Alpine *canescentes*, as it bears considerable resemblance to the var. *alpicola* of British botanists. I may refer those botanists who continue to use the name of *C. curta* for the species to Andersson's "Cyperaceæ Scandinaviæ," p. 58, where the author says: "Auctores Anglici Linnæum *C. canescens* nomine *C. brizoidem* v. *C. Buxbaumii* intellixisse contendunt, quare nostram *C. canescentem* *C. curtam*

dixerunt. Quæ transmutatio nominum e confusione minime insolita speciminum, quæ in herbario Linn. asservantur, evidenter orta est, quare nomen a botanicis suecicis semper adhibitum heic jure recepimus."—G. CLARIDGE DRUCE.

Poa nemoralis, Linn., "Sp. Pl." (1753), p. 69, var. *subuniflora*, Reichb., "Ic. Fl. Germ. et Helv.," i. p. 51, t. clix. f. 403: "Tenuissima spiculis paucis subunifloris." This depauperated variety, or form, occurs plentifully about the Corrymulzie Falls, in South Aberdeenshire. Professor Hackel is my authority for the name.—G. CLARIDGE DRUCE.

Scottish Fungi.—Miss A. L. Smith, in her paper on "Microscopic Fungi new to or rare in Britain," notes the following from Scotland:—

* *Peronospora Radii*, De Bary.—On leaves of *Chrysanthemum segetum*, Dalton, Dumfriesshire, August 1894. [I gathered this fungus on capitula of *Chrysanthemum segetum* in Orkney in 1888, and on capitula of *Matricaria inodora* in Aberdeenshire in 1890.—J. W. H. TRAIL.]

Sporodinia grandis, Link., and *Syzygites megalocarpus*, Ehr.—On decaying fungi, Annan, Dumfriesshire, August 1896.

* *Mortierella Rostafinskii*, Bref., on dead fir stump; and *M. candelabrum*, Van Tiegh. and Le Mon., on a fungus at Strathpeffer, August 1896; Mr. Jenkin.

* *Piptocephalis Freseniana*, De Bary.—Parasitic on *Pilaria* on rabbits' dung at Strathpeffer; Mr. Jenkin.

Achlya apiculata, De Bary.—On mouths of *Utricularia* bladders, Strathpeffer, Mr. Jenkin.

Ædocephalum Preussii, Sacc., *Cephalosporium Acremonium* Corda, and *Cephalothecium candidum*, Bon.—On decaying stems, etc., Annan, Dumfriesshire, August 1896.

* *Periconia pycnospora*, Fres.—On dead herbs and *Acremoniella pallida*, Cooke and Massee, Annan, August 1896.

Stachybotrys alternans, Bon.—On packing-straw from Edinburgh, June 1896.

New Forms of British Rubi.—The Rev. W. Moyle Rogers, in the "Journal of Botany" for February (pp. 42-50), gives a full enumeration of the forms of *Rubus* found by himself and by his son, in the summer of 1896, in five counties of Midland and West Scotland, but chiefly near Callander in West Perth. They are numerous, among them being four not previously recorded from Britain. These are:—

"*R. Scheutzii*, Lindeb. (= *R. Lindebergii*, P. J. Muell., var. *tristis*, Aresch).—One of the most abundant and most constant brambles seen by me in Mid Scotland. West Perth—exceedingly common about Callander, Loch Vennachar, Lake of Monteith, and between it and Aberfoyle. Mid Perth—Knock of Crieff,

Crianlarich (Rev. E. S. Marshall). Stirlingshire—about Stirling and Gargunnoch. . . . I should say that its nearest allies in our list are *R. pulcherrimus*, Neum., and *R. Lindebergii*, P. J. Muell. ; but its peculiar leaves, glabrous stem, and very different colouring, make it recognisable from both at a glance, nor do I think it possible for any careful observer to confuse the living bush with other British forms. The following are its most marked characters:—It grows in large, rather low, circular masses, with glabrous, shining stem, green, rhamnifoliate, nearly glabrous leaves, a remarkably broad subrotund-cuspidate terminal leaflet, and a long, very narrow, more or less flexuous panicle with large flowers, long stamens, pinkish-lilac petals, and gray-green sepals, which are only loosely reflexed on the fall of the petals, and become more or less subpatent afterwards.”

“*R. hirtifolius*, Muell. and Wirtg., var. *danicus*, Focke.—West Perth—common, Callander, Loch Earn, Lake of Monteith, etc. Mid Perth—Knock of Crieff (a form intermediate between type and variety), Crianlarich (E. S. Marshall). Argyle—Dalmally (E. S. Marshall). Stirlingshire—in two localities (Messrs. Kidston and Stirling). Mid Ebbes—Coll (S. M. Macvicar). Sutherland. A plant gathered by Mr. F. J. Hanbury at Tongue is probably this.”

“The following is Dr. Focke’s note on the West Perth specimens :—‘This is indeed my *Rubus danicus*, which I put as a variety under *R. hirtifolius*, Muell. and Wirtg. It is a plant that is nearly intermediate between *R. macrophyllus* and *R. pyramidalis*. Terminal leaflet much more rounded than in either species.’ . . . It seems to me much nearer to var. *Schlechtendalii* than to typical *macrophyllus*, though distinguished from both without difficulty by the ascending sepals (common to it and to *R. hirtifolius*) and the very differently shaped terminal leaflet. The more roundish cuspidate-acuminate terminal leaflet is also one of the characters by which *danicus* is distinguished from typical *hirtifolius*, together with the more hairy under surface of the leaves and the luxuriant panicle with more conspicuously hairy rachis and more showy flowers. The bracts are usually somewhat gland-ciliate, and the pedicels occasionally a little glandular; but generally it seems a more nearly eglandular plant than the type, though that also, like many of its allies, is variable in this respect. The petals are white, and the sepals reflexed in flower, but quickly becoming patent.”

“*R. melanoxydon*, Muell. and Wirtg.—West Perth, fairly common, seemingly distinct, in spite of considerable variation in armature. Callander Crags; near L. Vennachar and L. Earn; moor between Callander and Port of Monteith. Dr. Focke writes: ‘The species is not well known, and its limits are quite uncertain. Your plant from Scotland, however, is more like the original specimens than anything I met with under this name.’ . . . It seems nearly allied

to *R. mucronatus*, Blox., and *R. podophyllus*, P. J. Muell., coming between them and the more glandular states of *R. calvatus*, Blox., and distinguishable from the two former by its stronger, larger prickles, more mixed armature, gradually acuminate leaflets, compound panicle, and dark purplish brown colour of stem and rachis; and from *R. calvatus* by the close, even tooothing and soft under surface of its more roundish-acuminate terminal leaflet, as well as by the mixed armature. . . . My very distinct Hants and Dorset plant, described as *R. melanoxyton* by Professor Babington in 'Journ. Bot.,' 1890, p. 133, is *R. melanodermis*, Focke."

"*R. Drejeri*, G. Jansen.—West Perth, by Lochs Earn and Vennachar; Stirling, on Castle Hill, and among rocks beyond King's Park. Thus named for me by Dr. Focke, with the additional note: '*R. Drejeri*, I think, is exactly the same plant as the type from Slesvig and Denmark.' This is not quite the plant described by me in 'Journ. Bot.,' 1892, p. 271, under the same name, then suggested for it by Dr. Focke, that being the *R. Leyanus*, Rogers, 'Lond. Cat.,' ed. 9, No. 482, a widespread and locally abundant form with us, which appears to be unknown on the Continent. The true *R. Drejeri* . . . differs from *R. Leyanus* in its dull-coloured, more hairy stem, its chiefly 3-nate leaves and *shortly pointed roundish or obovate leaflets*, with less formal outline, *looser tooothing*, and *harsher greener under surface*, its much longer and *more cylindrical panicle* with hairier and more densely prickly rachis and broader less attenuate sepals. Thus the shining, neat look and yellowish colour so characteristic of *R. Leyanus* give place to a rough, shaggy look and dull brownish colour in *R. Drejeri*, and the close alliance between them is by no means striking at first sight. . . . I think that form (*Leyanus*) had best be placed as a strongly marked variety under *R. Drejeri*."

In addition to the above forms there are many new county records, especially from West Perth, but these will appear in due course in Mr. Bennett's annual report of additions to "Topographical Botany."

CURRENT LITERATURE.

The Titles and Purport of Papers and Notes relating to Scottish Natural History which have appeared during the Quarter—January-March 1897.

[The Editors desire assistance to enable them to make this Section as complete as possible. Contributions on the lines indicated will be most acceptable and will bear the initials of the Contributor. The Editors will have access to the sources of information undermentioned.]

ZOOLOGY.

THE ISLANDS OF YELL SOUND. By Robert Godfrey. *The Field*, 9th January 1897, p. 62.—Treats of the birds of these islands, and of the mammals in the surrounding waters.

BY RIVER AND LOCH IN AYRSHIRE. By Boyd Alexander. *The Field*, 23rd January 1897, p. 100.—Deals with the bird-life of the district round Ballochmyle.

UNST AND ITS BIRD-LIFE. By Robert Godfrey. *The Field*, 30th January 1897, p. 134.

PROTECTION OF WILD BIRDS IN SCOTLAND.—*The Field*, 30th January 1897, p. 135.—Summary of orders made by the Secretary for Scotland for the counties of Dumbarton, Berwick, and Haddington.

SLAVONIAN GREBE AND LITTLE AUK AT ST. ANDREWS. M. J. C. M. *The Field*, 20th February 1897, p. 243.—Six of the former and a good many of the latter birds recorded.

ADDITIONS TO "BRITISH CONCHOLOGY." By J. T. Marshall. *Journal of Conchology*, viii. pp. 338-352 (January 1897).—These notes include a large number of Scotch records.

NOTES FROM THE WEST OF SCOTLAND. A. Adie Dalglish. *Ent. Record*, vol. ix. p. 17 (15th January 1897).—Records of fifty species of Lepidoptera from various localities.

COLLECTING ON THE EAST COAST OF SCOTLAND. Arthur Horne. *Ent. Record*, vol. ix. p. 18 (15th January 1897).—Notes of thirty-two species of Lepidoptera from Aberdeen, Kincardineshire, etc.

LEPIDOPTERA OBSERVED IN GLEN LOCHAY. By Kenneth J. Morton, F.E.S. *Ent. Mo. Mag.* (2), vol. viii. pp. 1-4 (January 1897).—A long list of species taken during the month of June 1895.

COLIAS HYALE IN SCOTLAND. J. R. Malloch. *Ent. Mo. Mag.* (2), vol. viii. p. 62 (March 1897).—An interesting and beautiful specimen captured in a clover-field on 5th August 1896; no precise locality is given.

EUVANESSA ANTIOPA IN ABERDEENSHIRE. Wm. Cowie. *Ent. Record*, vol. ix. p. 20 (15th January 1897).—Specimen captured on 4th October 1896 between Logierieve and Esslemont.

CHÆROCAMPA NERII IN ABERDEENSHIRE. Arthur Horne. *Ent. Record*, vol. ix. p. 63 (March 1897).—A male taken on 19th September at Grandholm Works, near Aberdeen.

NOCTUA DEPUNCTA AND MANIA MAURA IN ROXBURGHSHIRE. A. Elliot. *Ent. Mo. Mag.* (2), vol. viii. p. 63 (March 1897).—Specimen taken at Caverton in August 1896.

OCCURRENCE OF "HADENA" MAILLARDI, HÜB., IN THE SHETLAND ISLES. By C. G. Barrett, F.E.S. *Ent. Mo. Mag.* (2), vol. viii. pp. 51-52 (March 1897).—This paper establishes the identity of this moth with *Crymodes exulis*, of which it is a variation.

SETINA IRRORELLA IN SUTHERLAND. Herbert Ashby. *Entomologist*, vol. xxx. p. 81 (March 1897).—Specimen obtained in June 1896 on a small island in Badcall Bay, on the West Coast.

XANTHOLINUS DISTANS, KR., IN CAITHNESS. Alfred Thornley. *Ent. Mo. Mag.* (2), vol. viii. p. 19 (January 1897).—A few examples taken near Thurso in August 1892.

LIMNOPHILUS ELEGANS, C., AT RANNOCH. James J. F. X. King. *Ent. Mo. Mag.* (2), vol. viii. p. 14 (January 1897).—A specimen taken in Currie Wood during May 1896.

BOTANY.

ON ROBERT BROWN. Presidential Address to Edinburgh Botanical Society, by Professor F. O. Bower, F.R.S. *Trans. and Proc. Bot. Soc. Edin.*, xx. part iii. pp. 459-468.

THE GERMINATION OF BARLEY WITH RESTRICTED MOISTURE. By T. Cuthbert Day. *Trans. and Proc. Bot. Soc. Edin.*, xx. part iii. pp. 492-501.

AN ATTEMPT TO CLASSIFY COMMON PLANT PIGMENTS, WITH SOME OBSERVATIONS ON THE MEANING OF COLOUR IN PLANTS. By Miss M. J. Newbiggin, B.Sc., *Trans. and Proc. Bot. Soc. Edin.*, xx. part iii. pp. 534-550.

NOTES FROM THE ROYAL BOTANIC GARDEN, EDINBURGH. Being,—I, Report on Vegetation from July to December 1895, by ROBERT LINDSAY; II, Meteorological Observations for same months; III, Notes on Plants in the Plant Houses, by R. L. HARROW. *Trans. and Proc. Bot. Soc. Edin.*, xx. part iii. pp. 472-479, 487-489, 502-506.

AUSTRALIAN AND OTHER FOREIGN TREES AND PLANTS IN ARRAN, ALL UNPROTECTED. By Rev. David Landsborough. *Trans. and Proc. Bot. Soc. Edin.*, xx. part iii. pp. 508-531.

EXCURSION OF THE SCOTTISH ALPINE BOTANICAL CLUB TO TYNDRUM IN 1895. By William Craig, M.D. *Trans. and Proc. Bot. Soc. Edin.*, xx. part iii. pp. 481-486.

PLANTS OF TIREE AND COLL. By Symers M. Macvicar. *Journ. Bot.*, February, pp. 54-57.—*Ranunculus marinus*, Fries, from Tiree, is the first "satisfactory" record from Scotland known to Mr. A. Bennett; *Potamogeton coloratus*, Hornem., is new county record from Coll; and *Plantago Coronopus*, var. *maritima*, Gren. and Godr., is new record of variety from Britain.

HIGHLAND PLANTS COLLECTED IN 1896. By Rev. E. S. Marshall, M.A., F.L.S., and W. A. Shoolbred, F.R.C.S. *Journ. Bot.*, March, pp. 65-71.—Chiefly in Glen Spean, in Corrie Ardran, and Glen Falloch (Mid Perth), and at Ardlui in Dumbarton.

ON SOME SCOTTISH RUBI. By Rev. W. Moyle Rogers, F.L.S. *Journ. Bot.*, February, pp. 42-50.—Records full results of exploration

in 1896 of Callander and other localities in West Perth, Knock of Crieff, and near Killin and Loch Tay in Mid Perth, and brief visits to Oban, Balloch, and Stirlingshire.

SET OF BRITISH RUBI. A supplementary fascicle (Nos. 106-134) has just been issued by Messrs. E. F. Linton, W. R. Linton, and Rogers. It contains seven forms that, "so far as is known at present, are endemic." The specimens are excellent, as in the previously issued fascicles. None are from Scotch localities.

BRITISH HIERACIA. Second fascicle, issued by Messrs. E. F. and W. L. Linton.—Many of the examples are Scottish.

CAREX AQUATILIS Wahlb. IN LAKE LANCASHIRE, by Arthur Bennett, F.L.S. (*Naturalist*, March 1897, pp. 77-80). The distribution of the species in Great Britain and Ireland is fully discussed under the vice-counties. These amount to three in North England, twenty-one in Scotland, and seven in Ireland.

HYMENOPHYLLUM TUNBRIDGENSE, SM., IN S. EBODES, v.c. 102. By A. Somerville. *Journ. Bot.*, January, p. 21.—In Kildalton Woods, Islay.

MOSS EXCHANGE CLUB MS. REPORT FOR 1896. *Journ. Bot.*, January, pp. 30-31.—In this brief notice the following are mentioned from Scotland:—*Hypnum procerrimum* from Perthshire (R. H. Meldrum), and *P. cochleariforme*, Weis., from Moidart (S. M. Macvicar).

THUIDIUM PHILIBERTI, LIMPR., A NEW BRITISH MOSS. By H. N. Dixon, M.A., F.L.S. *Journ. Bot.*, January 1897, pp. 16-17).—Found sterile near summit of Craig Chailleach in Perthshire in 1893. Described and distinguished from its nearest allies (*T. delicatulum*, Mitt., and *T. recognitum*, Lindb.) most readily by stem leaves drawn out into fine hyaline hair of a single row of linear cells.

MICROSCOPIC FUNGI NEW TO, OR RARE IN, BRITAIN. By Annie Lorrain Smith. *Journ. Bot.*, January 1887.—Several of the species are from localities in Scotland (see p. 129).

FUNGI OBSERVED IN GLEN URQUHART, INVERNESS-SHIRE (at the meeting of the Scottish Cryptogamic Society in 1895). By Rev. David Paul. *Trans. and Proc. Bot. Soc. Edin.*, xx. part iii. pp. 468-471.—*Polyporus ciliatus*, Fr., new to Britain, and various rare species.

ALGÆ AT LOSSIEMOUTH. *Journ. Bot.*, January, p. 31.—Mr. E. M. Holmes exhibited at the Linnean Society's meeting of 3rd Dec. 1896, *Liebmannia major*, new to Britain, found by himself in August 1896.

THE GENUS GLOIOPELTIS. By Professor Fr. Schmitz, Greifswald. *Trans. and Proc. Bot. Soc. Edin.*, xx. part iii. pp. 554-570.

REVIEWS.

FIRST RECORDS OF BRITISH FLOWERING PLANTS. By William A. Clarke, F.L.S. Reprinted, with additions and corrections, from the "Journal of Botany," 1892-96. (London: West, Newman, and Co., 1897.)

We have frequently had occasion to quote from Mr. Clarke's compilation extracts relating to first records of plants from Scottish localities; and we very gladly welcome the issue of the work, which in its completed state forms an octavo of 103 pages. Only those that have attempted such work can fully appreciate the labour required in its execution, and the care with which it has been prepared. It deserves, and ought to find, a hearty welcome from all interested in British botany, and especially from those who desire to know something of the growth of systematic study of the flora. An index of genera adds to its value for reference in its new form.

A MANUAL AND DICTIONARY OF THE FLOWERING PLANTS AND FERNS. By J. C. Willis, M.A. (Cambridge University Press, 1897.)

This work, in two small octavo volumes, is one of the excellent "Cambridge Natural Science Manuals." Though not specially devoted to British botany, it will be found most suggestive and useful as a companion to the systematic floras, directing the attention to points (not requiring a microscope for their investigation) in the structure and biology of the more important native genera that are seldom touched on in such floras. The first volume treats of such subjects as General Morphology, Variation, Evolution, Classification, Forms of Vegetation, Geographical Distribution, and Economic Botany. This part will repay careful perusal. The second volume is prepared in the form of a dictionary for reference.

INVESTIGATIONS INTO APPLIED NATURE. By William Wilson, Jun. (London: Simpkin, Marshall, Hamilton, Kent, and Co., 1896.)

This little volume consists of a number of essays, some of which had been read at the meetings of various societies, while others are published in it for the first time. With the connecting link that all relate more or less to agriculture, they range over a wide field in their choice of subjects; and, in consequence, a good many of them are only Mr. Wilson's conceptions of information gleaned by him from varied sources. Some of the papers, on the other hand, are based on personal observations, and show power of observation and love of the open-air study of natural history in its applications to agriculture.

THE MIGRATION OF BIRDS: A CONSIDERATION OF HERR GÄTKE'S VIEWS. By F. B. Whitlock. (London: R. H. Porter, 1897.) Price 3s. 6d. net.

This is a brochure of 140 pages devoted, as its title implies, to a critical examination of Herr Gätke's views on bird-migration as set forth in his now well-known volume on the Ornithology of Heligoland. Mr. Whitlock deals with the subject under five heads, namely:—(1) Direction of the Migration Flight; (2) Altitude of the Flight, and Meteorological Conditions which influence Migration; (3) Velocity of the Flight; (4) The causes of the Migratory Movement, and what guides Birds during their Migrations; and (5) Exceptional Migration Phenomena. (A Table of Contents to facilitate reference to these chapters would have been a decided convenience.)

Herr Gätke's theories—speculations we had almost said—on several of these points are, we believe, pretty generally regarded among ornithologists as decidedly extravagant and unsupported by anything deserving the name of proof; but mainly, no doubt, from generous motives, with which we fully sympathise, no adequate criticism of them has previously appeared in this country, though doubtless Dr. J. A. Allen's able notice in the American journal "The Auk," for April 1896, is familiar to many of our readers. Mr. Whitlock's pamphlet should therefore be welcomed by all who desire to see the other side of the question placed before the public in a manner worthy of its importance. To our mind there can be little doubt on which side the balance of evidence lies. Before we can believe with Herr Gätke that the majority of migratory birds, contrary to all we know of their physical powers and organisation, can suddenly, on two nights in the year, rise from the lower atmosphere in which their lives are spent to an altitude of from four to seven miles above sea-level, and there, in spite of the rarity, etc., of the air, not only live, but put forth powers of flight far exceeding anything they seem capable of when within our ken,—before, we say, we can believe this, some solid evidence of its possibility and necessity will have to be adduced.

But those who wish to see an ample and thoughtful discussion of the objections to Herr Gätke's views, and the difficulties which surround them, cannot do better than read Mr. Whitlock's little book; and along with it we would suggest the perusal of Mr. Eagle Clarke's "Digest of the Observations on Migration," in which what undoubtedly are the true bearings of meteorological conditions upon migration are explained.

W. E.

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REPORT ON THE MOVEMENTS AND OCCURRENCE OF BIRDS IN SCOTLAND DURING 1896.

By LIONEL W. HINXMAN, B.A.
Member of the British Ornithologists' Union.

IT is satisfactory to be able to report a considerable increase in the number of schedules sent in for 1896. Thirty-four in all have been received, as compared with twenty in 1895. Of these, twenty-two come from lighthouses and coast-stations, the remainder from inland observers.

The faunal areas of Moray, Tay, Outer Hebrides, and West Ross are still most insufficiently represented, and it is hoped that additional observers in these districts may this year be added to the list. Schedules can always be obtained from Mr. W. Eagle Clarke, Museum of Science and Art, Edinburgh.

It remains to convey our hearty thanks to all those who have kindly assisted in these inquiries, with the hope that they may be able to induce others to record and send in their observations.

The following list gives the names of observers from whom reports have been received. The localities are arranged

under the different faunal areas, proceeding from north to south along the east and west coasts.

SHETLAND.

<i>Locality.</i>	<i>Name of Observer.</i>
North Unst L.H.	James Ferrier.
Sumburgh Head L.H.	D. Sinclair.

ORKNEY.

N. Ronaldshay L.H.	Chas. M'Fadyen.
Isle of Graemsay L.H.	Sam. Sutherland.
N. Ronaldshay	Allan Briggs.

SUTHERLAND.

Dunnet Head L.H.	Arch. M'Eachern.
Holburn Head L.H.	Peter Anderson.
Cape Wrath L.H.	Neil M'Donald.
Thurso	Lewis Dunbar.

MORAY.

Cromarty L.H.	Donald Miller.
Badenoch	Lionel W. Hinxman.

DEE.

Kinnairds Head L.H.	Robert Murray.
Ratray Head L.H.	R. Clyne and J. Gilmour.
Peterhead	Rev. W. Serle.

TAY.

Arbroath	T. F. and W. J. Dewar.
Tayfield, Newport	William Berry.

FORTH.

Inchkeith L.H.	William Gilmour.
Lothians	Bruce Campbell.
Lothians	Robert Godfrey.
Dalmeny	Charles Campbell.
Aberfoyle and E. Lothian	William Evans.

TWEED.

Hallmyre, Peebles	David G. Laidlaw.
Chirnside, Eastern Borders	Charles Stuart, M.D.

OUTER HEBRIDES.

<i>Locality.</i>	<i>Name of Observer.</i>
Barra	John M'Rury, M.B.

ARGYLL AND INNER HEBRIDES.

Isle Ornsay, Skye	The Lightkeepers.
Skerryvore L.H.	John Nicol and William Ross.
Dhuheartach L.H.	W. Davidson.
Tiree	Peter Anderson.

CLYDE.

Lamlash L.H.	James Edgar.
Pladda L.H.	Robert A. M'Harrie.
Ailsa Craig L.H.	William A. Tulloch.
Turnberry Point L.H.	Thomas J. Wallace.
Various localities	{ John Paterson, John Robertson, H. B. Watt, Robert Wilson.

SOLWAY.

Mull of Kintyre L.H.	William Quine.
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GENERAL REMARKS.

The mild winter of 1895-96 was followed by a warm and early spring, and the dates recorded for the appearance of our summer migrants are, on the whole, slightly earlier than in 1895, but show no marked departure from the normal.

The spring bird-movements recorded are unimportant. Skylarks were observed in small numbers at Skerryvore Feb. 13-18, and Thrushes, with other birds unidentified, April 4-7. From Tiree comes the usual note of the northward passage of Whimbrels and White Wagtails at the latter end of April.

The principal autumn migratory movement appears to have taken place between the 4th and 14th of September, and was noticed both on the East and West Coasts. In North Ronaldshay, Orkney, with E. and S.E. winds, birds appeared in increasing numbers from Sept. 7 to Sept. 12, when a regular rush took place—including Redstarts "in swarms," Whitethroats, Pied Flycatchers, Willow Wrens, and Pied

Wagtails. Wind S.E., strong. At Rattray Head L.H. a rush of Redstarts and Whitethroats occurred on Sept. 7, wind S.S.E.

On the West Coast rushes of Wheatears, Robins, Meadow Pipits, and Pied Wagtails were noted at Skerryvore and Dhuheartach, Sept. 5-14, with easterly winds; and Wheatears and Robins at Pladda, Sept. 5-7. A later rush of Thrushes, Chaffinches, and Snow Buntings was observed at Skerryvore, Nov. 4 and 5, with strong N.W.-S.W. winds.

Among other points of interest contained in the reports, attention may be called to the evidence for the farther extension of range of the Stock Dove and Tufted Duck; the unusual number of Turtle Doves, reported from many widely separated localities; the occurrence of Wrynecks in the Orkney Islands and at Arbroath, and of the Red-backed Shrike (*Lanius collurio*) at Rattray Head.

The list of rare and casual visitants includes a specimen of the Barred Warbler (*Sylvia nisoria*) killed at Dhuheartach Light on Sept. 8, during a rush of other birds; male Squacco Heron (*Ardea ralloides*), killed in North Ronaldshay, Sept. 7; Night Heron (*Nycticorax griseus*), young male, Barra, O.H., Oct. 12; Bittern (*Botaurus stellaris*), in Stirlingshire, Feb. 18; Hoopoe (*Upupa epops*), taken near Stirling, Nov. 16; Roller (*Coracias garrula*), in the Orkney Islands and East Lothian; and an *adult* specimen of Sabine's Gull (*Xema sabinii*), seen in Aberlady Bay, August 24.

TURDUS MUSICUS (Song Thrush).

Orkney—N. Ronaldshay, Sept. 5; 12, in rush with Warblers. *Argyll*—Tiree, Oct. 26; Skerryvore, April 5, 7, 18, 20; Nov. 4, in rush with other birds, N.W. *Clyde*—Ailsa Craig, Oct. 31, Nov. 9; Pladda, Mar. 10, April 16, Dec. 9; Camphill, Glasgow, "numerous to Oct. 26."

TURDUS ILIACUS (Redwing).

Moray—Insh, Oct. 17. *Forth*—Roslin, Oct. 12. *Tweed*—Chirnside, Nov. 15. *Outer Hebrides*—Barra, Nov. 3-May 5. *Argyll*—Skerryvore, Oct. 7; Tiree, Oct. 24. *Clyde*—Ailsa, Oct. 18; Queen's Park, Glasgow, Nov. 7, Mar. 15.

Earliest observed, Oct. 7, Skerryvore.

TURDUS PILARIS (Fieldfare).

Moray—Kincraig, Oct. 23. *Dee*—Peterhead, unusually numerous. *Forth*—Thriepmuir, Oct. 28. *Tweed*—Chirnside, Nov. 15. *Argyll*—Skerryvore, Oct. 11; Tiree, Oct. 27; Dhuheartach, Nov. 3, 5. *Clyde*—Ailsa, Sept. 21; Pladda, Oct. 28-April 7; Camphill, Oct. 27. Earliest observed, Sept. 21, Ailsa.

TURDUS MERULA (Blackbird).

Shetland—N. Unst, Sept. *Dee*—Peterhead, Oct. 27, on migration. *Argyll and Isles*—Skerryvore, Mar. 14, June 3; Nov. 4, 5, in rush; Nov. 26. Dhuheartach, Nov. 5. *Clyde*—Pladda, Mar. 10, in rush with other *Turdidæ*; Sept. 2, Dec. 22.

PRATINCOLA RUBETRA (Whinchat).

Orkney—N. Ronaldshay, Sept. 2, 10, 12, in rush with Warblers. *Forth*—Aberfoyle, May 3. *Tweed*—Chirnside, May 3. *Outer Hebrides*—Barra, May 12. *Argyll and Isles*—Skerryvore, May 4, Aug. 13, Sept. 4. *Clyde*—Mallsmire, April 29; Loch Fyne, Sept. 4. Earliest, April 29; latest, Sept. 12.

SAXICOLA CENANTHE (Wheatear).

Orkney—Island of Graemsay, May 25-Sept. 17. *Moray*—Glen Feshie, April 7. *Dee*—Peterhead, April 9, Oct. 4. *Forth*—Pentlands, Mar. 19. *Tweed*—Chirnside, April 22-Sept. 20; Hallmyre, April 8. *Outer Hebrides*—Barra, Mar. 24. *Argyll and Isles*—Tiree, Mar. 25; Dhuheartach, Sept. 4-6 (in rush), E., 13-14 (rush), 18; Skerryvore, Mar. 12, Apr. 1, 14, 21, May 4, 14, 24, Aug. 10, 13, Sept. 5-10, in rush with Pipits and Wagtails, E., Sept. 17-21; Ben Nevis, April 3. *Clyde*—Ailsa, Sept. 14 (in numbers), April 21; Pladda, Sept. 2-7; Mallsmire, March 16; Neilston, Sept. 20.

Earliest, March 12, Skerryvore; latest, Oct. 4, Peterhead. Principal movements, Sept. 4-14.

RUTICILLA PHENICURUS (Redstart).

Orkney—N. Ronaldshay, Sept. 3; 8-12, "in swarms," a great rush N.E.; 13 (numbers), 14-19. *Sutherland*—Cape Wrath, May 5. *Moray*—Badenoch, April 22. *Dee*—Rattray Head, Sept. 7. *Forth*—Dalmeny, April 16; Aberfoyle, April 22. *Tweed*—Chirnside, April 28-Aug. 5. *Argyll and Isles*—Skerryvore, August 13-Sept. 8. *Clyde*—Beith, April 28; Camphill, Sept. 10.

Earliest, April 16, Dalmeny; latest, Ronaldshay, Sept. 19. Principal movements, Sept. 8-14.

ERITHACUS RUBECULA (Robin).

Argyll and Isles—Dhuheartach, Sept. 14, in rush with Wheatears and Larks. *Clyde*—Lamlash, Sept. 5, several; Pladda, Sept. 6.

SYLVIA CINEREA (Whitethroat).

Orkney—N. Ronaldshay, Sept. 7, 8, 12 (in rush), 13; Sept. 18, *S. curruca* (Lesser Whitethroat), one ♀. *Moray*—Kinrara, May 15. *Dee*—Ratray Head, Sept. 7; Pitfour, May 13. *Tay*—Tayfield, May 15. *Forth*—Dalmeny, May 4; Aberfoyle, May 9; Gladsmuir, Sept. 12. *Tweed*—Chirnside, April 28–Sept. 5. Hallmyre, April 28. *Outer Hebrides*—Barra, April 22. *Clyde*—Pladda, Sept. 7, 13; Giffnock, May 3.

Earliest, April 28, Chirnside; latest, Sept. 18, Ronaldshay. Principal movements, Sept. 8–13.

SYLVIA ATRICAPILLA (Blackcap).

Orkney—N. Ronaldshay, Sept. 7, 9, 13, 16. *Forth*—Dalmeny, April 25; Fife, May 8. *Tweed*—Chirnside, May 20. *Clyde*—Thornliebank, May 17.

Earliest, April 25, Dalmeny.

SYLVIA NISORIA (Barred Warbler).

Argyll and Isles—One killed at light, Dhuheartach, Sept. 8, E.S.E.

SYLVIA HORTENSIS (Garden Warbler).

Orkney—N. Ronaldshay, Sept. 3, 7, 11. *Forth*—Aberfoyle, May 6. *Clyde*—Ailsa Craig, May 14; Fiddler Gill, May 7.

ACROCEPHALUS PHRAGMITIS (Sedge Warbler).

Dee—Peterhead, Aug. 5. *Tweed*—Hallmyre, April 24. *Outer Hebrides*—Barra, June 16.

LOCUSTELLA NÆVIA (Grasshopper Warbler).

Forth—Aberfoyle, May 3. *Clyde*—Beith, April 22; Giffnock, April 30; Helensburgh, Aug. 3.

PHYLLOSCOPUS RUFUS (Chiffchaff).

Forth—Aberfoyle, April 17 (nested), Sept. 3. *Tweed*—Chirnside, April 10. *Clyde*—Ayr, March 30.

PHYLLOSCOPUS SIBILATRIX (Wood Wren).

Moray—Kinrara, May 7. *Forth*—Aberfoyle, May 4; Dalmeny, May 11. *Tweed*—Duns, May 15.

PHYLLOSCOPUS TROCHILUS (Willow Wren).

Orkney—N. Ronaldshay, Aug. 31, Sept 1, 3, and present in small numbers till 19th. *Moray*—Rothiemurchus, April 26. *Dee*—Peterhead, May 3-Sept. 7. *Forth*—Blackford Hill, April 22; Aberfoyle, April 22; Dalmeny, April 23; Penicuik, April 28; Luffness, Sept. 9. *Tweed*—Hallmyre, April 20; Chirnside, April 28-Sept. 10. *Clyde*—Daldowie, April 22; Queen's Park, Glasgow, Sept. 17.

Earliest, April 20, Hallmyre; latest, Sept. 19, Ronaldshay.

REGULUS CRISTATUS (Gold-crested Wren).

Clyde—Pladda L.H., Sept. 12, in numbers; Sept. 25, 28, Oct. 6, 11, 12.

LANIUS EXCUBITOR (Great Gray Shrike).

Clyde—Lanark, April 11.

LANIUS COLLURIO (Red-backed Shrike).

Dee—Ratray Head, Sept. 7.

MUSCICAPA GRISOLA (Spotted Flycatcher).

Orkney—N. Ronaldshay, Sept. 3. *Tay*—Tayfield, May 23; Fife, Aug. 19. *Tweed*—Hallmyre, May 17; Chirnside, left Sept. 1. *Clyde*—Pladda, Sept. 8; Thornliebank, May 17; Queen's Park, Sept. 19.

MUSCICAPA ATRICAPILLA (Pied Flycatcher).

Orkney—N. Ronaldshay, Sept. 2, 3, 11, 12 (in rush with other birds), 13.

HIRUNDO RUSTICA (Swallow).

Orkney—Graemsay, May 13. *Sutherland*—Cape Wrath, "Swallows," May 9, July 11. *Moray*—Forres, May 13. *Dee*—Ratray Head, April 25, Oct. 19; Peterhead, April 25-Oct. 17. *Tay*—Tayfield, April 25. *Forth*—Dalmeny, April 11; Aberfoyle, April 24; South Queensferry, Oct. 9; Tynninghame, Nov. 23 (one). *Tweed*—Chirnside, April 3; Hallmyre, April 13; Whitadder, Oct. 4. *Outer Hebrides*—Barra, May 12 (nesting for first time on island). *Argyll and Isles*—Tiree, May 5, Oct. 6; Skerryvore, May

10. *Clyde*—Renfrewshire, var. loc., April 18; Rutherglen, Oct. 11.
Solway—Moffat, Oct. 25.

Earliest, April 3, Chirnside. Latest, Oct. 25, Moffat; November 23, Tynninghame.

CHELIDON URBICA (House Martin).

Orkney—N. Ronaldshay, Sept. 4, 5, 14. *Forth*—Cramond, April 11; South Queensferry, Oct. 9. *Tweed*—Chirnside, May 7-Sept. 30; Hallmyre, April 15. *Outer Hebrides*—Barra, May 15. *Clyde*—Ailsa Craig, May 9, Oct. 12; Lamlash, April 24; Eaglesham, May 2; Mearns, Sept. 28.

Earliest, April 11, Cramond; latest, Oct. 9, South Queensferry.

COTILE RIPARIA (Sand Martin).

Orkney—N. Ronaldshay, Aug. 19, Sept. 5. *Moray*—Badenoch, April 22. *Forth*—Doune, April 12. *Tweed*—Chirnside, April 25-Aug. 29; Hallmyre, April 15. *Solway*—Lendalfoot, March 22.

Earliest, March 22; latest, Sept. 5.

FRINGILLINÆ (Finches and Linnets).

Shetland—*L. linaria* (Mealy Redpoll), Unst, April 25. *Dee*—Peterhead, well-defined flocks of Greenfinches and Yellow-Hammers first seen Oct. 7, W.; do. do. Nov. 7, 8, 21; Chaffinches and Linnets, Dec. 26, 27. *Tweed*—Chirnside, Bramblings, Oct. 25, remaining till late April; Oct. 25, Chaffinches and Greenfinches in large flocks. *Outer Hebrides*—Barra, Mealy Redpoll, Oct. 8; Brambling, Oct. 12. *Argyll and Isles*—Tiree, flocks of Greenfinches, Oct. 26; Skerryvore, Linnets, April 21; Brambling, Nov. 2; Chaffinches, Nov. 4, 5, in rush. *Clyde*—Ailsa Craig, Feb. 3, Chaffinches and Bramblings; Feb. 4, Mealy Redpoll; Oct. 18, Bramblings; Nov. 16, Dec. 7, 13, Chaffinches; Dec. 27, Greenfinches; Dec. 13, Linnets; Giffnock, Goldfinch, Nov. 15; Bramblings, Nov. 29.

Principal movements, Oct. 7, 25, 26, Nov. 4-21, Dec. 26, 27.

PLECTROPHANES NIVALIS (Snow Bunting).

Shetland—N. Unst, Feb. 16 "in hundreds," April 6; "a few remain all summer." *Orkney*—N. Ronaldshay L.H., Nov. 6, "swarms," E. *Forth*—Largo, Sept. 29; Aberlady, Oct. 7. *Outer Hebrides*—Barra, Oct. 5 (in large flocks after this date). *Argyll and Isles*—Tiree, Sept. 30; Dhuheartach, Oct. 3, 9, 25; Skerryvore, July 30 (?), Oct. 18, Nov. 4 (in rush). *Clyde*—Ailsa, Feb. 6 (in numbers), Oct. 18; Pladda, Oct. 20, Nov. 5 (in flocks); Queen's Park, Glasgow, Nov. 29, March 11.

Principal movements, Feb. 6, 16, Nov. 4-6.

LOXIA CURVIROSTRA (Crossbill).

Tay—Tayfield, Jan. 5, flock ; Scotsraig, Oct. 30.

MOTACILLÆ (Wagtails).

Orkney—N. Ronaldshay, Aug. 7, 19, *M. lugubris* (Pied Wagtail), and in rush with other birds, Sept. 12. *Sutherland*—Cape Wrath, May 6, 11, "Wagtails" (probably *M. alba*). *Dee*—Peterhead, *M. lugubris* in extraordinary numbers last half of August ; Sept. 7, three *M. raii* (Yellow Wagtail). *Forth*—*M. alba*, Loch Ard, April 18 ; flocks of *M. lugubris* passing W. along shore at Inverkeithing, Sept. 28 ; *M. raii* nesting at Portobello, June 3 ; Luffness, Aug. 13. *Tweed*—Chirnside, *M. raii*, Aug. 4. *Outer Hebrides*—Barra, *M. alba* (White Wagtail), May 2. *Argyll and Isles*—Tiree, *M. alba*, April 22-24, passing N. ; do., S., Aug. 24. Dhuheartach, "Wagtails," Aug. 28, Sept. 6, 13, 18, in rush with Wheatears and Pipits. Skerryvore, *M. lugubris*, May 25, Aug. 12, Sept. 2 ; Sept. 6, 8, 12 (in rush) ; Nov. 1. *Clyde*—Ailsa, *M. raii*, May 10. Pladda, "Wagtails," Oct. 18, 20, 25. Glasgow, *M. alba*, Mar. 29. Dalbeth, Mar. 30, *M. raii*. Dalbeth, April 21 ; Mallsmire, Oct. 11.

Principal movements—*M. lugubris*, Aug. 15-30, Sept. 12-18, 28 ; *M. alba*, April 22-24, Aug. 24.

ANTHUS TRIVIALIS (Tree Pipit).

Orkney—N. Ronaldshay, Sept. 16. *Moray*—Insh, April 28. *Forth*—Aberfoyle, April 22 ; Dalmeny, May 4. *Tweed*—Hallmyre, April 22. *Clyde*—Beith, April 25.

Earliest, April 22, Hallmyre, Aberfoyle ; latest, Sept. 16, Ronaldshay.

ANTHUS PRATENSIS (Meadow Pipit).

Argyll and Isles—Dhuheartach, Sept. 4-6, in rush ; Oct. 3, 9. Skerryvore, Aug. 14, 19 ; Sept. 5-8, 12, in rush with Wheatears and Wagtails, E. ; Oct. 20. *Clyde*—Glasgow, Migrating in numbers, April 2, 3.

Principal movements, Sept. 4-12, April 2, 3.

ALAUDA ARVENSIS (Skylark).

Orkney—N. Ronaldshay L.H., Dec. 21. *Dee*—Peterhead, congregating from the W., Jan. 13-16. *Tweed*—Chirnside, Nov. 20, in great flocks. *Argyll and Isles*—Dhuheartach, Sept. 14 (in rush), Oct. 10 (rush) ; Skerryvore, Feb. 13-18, Aug. 19.

CYPSELUS APUS (Swift).

Orkney—N. Ronaldshay, Sept. 4, 14. *Moray*—Forres, May 10.
Dee—Peterhead, May 11, Aug. 18. *Tay*—Arbroath, May 9, Aug. 22.
Forth—Alloa, May 9. *Tweed*—Chirnside, May 6, Aug. 5. *Outer
 Hebrides*—Barra, June 16. *Argyll and Isles*—Skerryvore, May 13.
Clyde—Cambuslang, May 8; Crookston, Aug. 26.

Earliest, May 6, Chirnside; latest, Sept. 14, Ronaldshay.

PICUS MAJOR (Great Spotted Woodpecker).

Forth—Dalmeny, May 26.

IYNX TORQUILLA (Wryneck).

Orkney—N. Ronaldshay, Sept. 3, one ♀; Sept. 6, one. Shapin-
 shay, one ♀, Sept. 14. *Tay*—Arbroath, May 17.

CORACIAS GARRULA (Roller).

Orkney—Taken at Westray, June. *Forth*—♀ shot at Tynning-
 hame, E. Lothian, Sept. 28.

UPUPA EPOPS (Hoopoe).

Forth—One caught on Menstrie Hill, Stirling, Nov. 16.

CUCULUS CANORUS (Cuckoo).

Moray—Glen Feshie, May 5. *Dee*—Peterhead, April 26. *Tay*
 —Tayfield, May 2. *Forth*—Dalmeny, April 16; Aberfoyle, April 23.
Tweed—Berwickshire, May 5. *Outer Hebrides*—Barra, May 5.
Argyll and Isles—Earraid, April 30; Tiree, May 9. *Clyde*—Mearns,
 April 4 (!); Lamlash, April 30.

Earliest, April 4, Mearns.

FALCO CANDICANS (Greenland Falcon).

Argyll—Waternish, Skye, May 26; Portree, Dec.

ARDEIDÆ (Hérons).

Orkney—*Ardea ralloides* (Squacco Heron), ♂, N. Ronaldshay,
 Sept. 7. *Outer Hebrides*—*Nycticorax griseus* (Night Heron), young
 ♂, Barra, Oct. 12.

BOTAURUS STELLARIS (Bittern).

Forth—Barton, Stirlingshire, Feb. 18.

ANSERINÆ (Geese).

Orkney—N. Ronaldshay, *A. brachyrhynchus* (Pinkfooted Goose), Oct. 6, "rare." *Sutherland*—Thurso river, Feb. 25, "rare." *Tay*—Tayfield, *A. brachyrhynchus*, Sept. 30, last seen April 20. *Forth*—*A. brachyrhynchus*, Aberlady, Sept. 29; *Bernicla leucopsis* (Bernacle Goose), Aberlady, Oct. 8. *Outer Hebrides*—Barra, *B. leucopsis*, Oct. 13; last seen May 2. *Argyll and Isles*—Tiree, "Geese" travelling S., Sept. 29; *B. brenta* (Brent Goose), Oct. 13; *A. albifrons*—Oct. 16; *B. leucopsis*, Oct. 18. *Clyde*—Fairlie Road, Feb. 15, "over 100 Brent."

CYGNUS MUSICUS (Whooper Swan).

Outer Hebrides—Barra, Jan. 8, flying W. *Argyll and Isles*—Tiree, Nov. 3, numerous, with *C. bewicki*, Nov. 7.

ANATIDÆ (Ducks).

Shetland—Walls, *Fuligula marila* (Scaup), June; Delting, *Clangula glaucion* (Golden Eye), July 8; Firth Voe, *Harelda glacialis* (Long-tailed Duck), July 22. *Orkney*—Graemsay, *H. glacialis* passing N.W., May 9; *Edemia fusca* (Velvet Scoter), Sept. 16. *Sutherland*—Thurso, *H. glacialis*, April 26. *Edemia nigra* (Scoter), Aug. 29. *Moray*—Loch Insh, 13 *Clangula glaucion*, May 16. *Dee*—Ratray Head, *H. glacialis*, April 30; Oct. 15, 23, Nov. 3, in large flocks. Peterhead, *Edemia nigra*, Oct. 21. *Forth*—*F. marila*, Nov. 6, Feb. 11; *Spatula clypeata* (Shoveller), Lammermuirs, April 17; *C. glaucion*, Lochend, March 25. *Tweed*—*Fuligula marila*, Coldingham Loch, April 20; *F. cristata* (Tufted Duck), nesting Duns Castle. *Outer Hebrides*—Barra, *H. glacialis*, Oct. 13; *F. marila*, May 15. *Argyll and Isles*—Tiree, *Spatula clypeata*, April 2; *Mergus albellus* (Smew), Aug. 19; *F. marila*, Oct. 6; *H. glacialis*, Oct. 20. *Clyde*—*Fuligula cristata*, Loch Fad, Bute, May 21; *F. marila* and *F. ferina* (Pochard), Balgray Dam, May 21, and through summer; *Mareca penelope* (Wigeon), Castle Semple, April 18, Balgray, Oct. 11; *Clangula glaucion*, Balgray Dam, May 3 (immature), Sept. 27.

COLUMBA ŒNAS (Stock Dove).

Forth—Nesting on Pentlands and at Dalmeny. *Clyde*—Cumbræ, Aug. 18.

TURTUR COMMUNIS (Turtle Dove).

Sutherland—Shurrery, June 12, July. *Tay*—Glen Shee, Oct. 1; Torryburn, Fife, Sept. 4, young ♂. *Forth*—Dalmeny, Oct. 20. *Outer Hebrides*—N. Uist, August, young. *West Ross*—Braemore, June 6; Inverewe, June.

CREX PRATENSIS (Land Rail).

Orkney—N. Ronaldshay L.H., May 20. *Moray*—Insh, May 7. *Dee*—Peterhead, May 25. *Tay*—Tayfield, April 29. *Forth*—Aberfoyle, May 5; Dalmeny, May 8. *Tweed*—Hallmyre, April 24. *Outer Hebrides*—Barra, May 8. *Argyll and Isles*—Earraid, April 16; Tiree, May 7; Skerryvore, June 7. *Clyde*—Langside, April 25.

Earliest, April 16, Earraid.

PORZANA MARUETTA (Spotted Crane).

Moray—Beauly Firth, Sept. 26. *Argyll and Isles*—Islay, Sept. 29.

RALLUS AQUATICUS (Water Rail).

Clyde—Pladda L.H., Nov. 4.

CHARADRIUS PLUVIALIS (Golden Plover).

Dee—Peterhead, in flocks, Nov. 8, "unusually numerous all winter." *Tay*—Tayfield, in flocks, Jan. 9, E. gale. *Argyll and Isles*—Tiree, Sept. 28, in numbers. *Clyde*—Ailsa, Oct. 8; Cathcart, numerous, Sept. 7.

SQUATAROLA HELVETICA (Gray Plover).

Tay—Tayfield, Jan. 9, in flock with *C. pluvialis*. *Forth*—Aberlady Bay, first immature birds, Sept. 11; adults in summer plumage, Aug. 7.

STREPSILAS INTERPRES (Turnstone).

Shetland—Sound of Yell, July 23. *Orkney*—N. Ronaldshay, Aug. 2, 7 (in breeding plumage). *Dee*—Peterhead, Mar. 14 (numerous), Aug. 17, 19. *Argyll and Isles*—Skerryvore, Aug. 10–May 1. *Clyde*—Lunderston Bay, May 9; Fairlie, Aug. 15.

PHALAROPUS FULICARIUS (Gray Phalarope).

Sutherland—Watten, Caithness, Sept. 23. *Solway*—On the Nith, Kelton, Sept 19, after strong N.W. winds.

CALIDRIS ARENARIA (Sanderling).

Orkney—N. Ronaldshay, first seen Aug. 13. *Dee*—Peterhead, Aug 23. *Forth*—Aberlady, Aug. 22, 24 (in flock). *Clyde*—Turnberry Point, June 5, Aug. 30.

SCOLOPAX RUSTICULA (Woodcock).

Sutherland—Dunbeath, Oct. 8 (winter migrants). *Moray*—Kingussie, Oct. 15. *Forth*—Pentlands, Oct. 28 ; Dublin St., Edinburgh, Nov. 16.

GALLINAGO MAJOR (Great Snipe).

Tay—St. Andrews, Sept. 22. *Solway*—Terregles, Dumfries, Oct. 2.

GALLINAGO GALLINULA (Jack Snipe).

Shetland—N. Unst, Nov. 9, at light. *Orkney*—N. Ronaldshay, Sept. 9. *Moray*—Badenoch, Oct. 11. *Tay*—Tentsmuir, Sept. 19. *Argyll and Isles*—Skerryvore, Sept. 8.

TRINGA SUBARQUATA (Curlew Sandpiper).

Forth—Aberlady Bay, Sept. 1, a dozen immature birds. *Clyde*—Glen Dam, Eastwood, Sept. 19, two immature birds.

TRINGA CANUTUS (Knot).

Orkney—N. Ronaldshay, Aug. 13 (only one seen). *Sutherland*—Thurso, Sept. 5. *Forth*—Aberlady, first immature birds seen, Aug. 21 ; Sept. 6, flock of 90, all immature but three. *Clyde*—Turnberry Point, Aug. 29.

TRINGA STRIATA (Purple Sandpiper).

Argyll and Isles—Skerryvore, July 26, Aug. 10-May 1. *Clyde*—Turnberry Point, June 5, Aug. 30.

TRINGA MINUTA (Little Stint).

Forth—Aberlady Bay, Sept. 5, three immature birds.

MACHETES PUGNAX (Ruff).

Orkney—N. Ronaldshay, Aug. 31. *Sutherland*—Thurso, Sept. 5, immature. *Forth*—Luffness, Aug. 13, one ♀ ; Sept. 3, nine (3 ♂, 6 ♀).

TOTANUS HYPOLEUCUS (Common Sandpiper).

Moray—Loch Insh, April 16. *Dee*—Peterhead, Aug. 19. *Forth*—Aberfoyle, April 20. *Tweed*—Coldingham, April 20 ; Chirnside, April 20-Aug. 20. *Outer Hebrides*—Barra, May 5. *Clyde*—Kenmuir, April 11 ; Ailsa, April 24 ; Pladda, Sept. 7 ; Balgray, Sept. 19.

LIMOSA LAPPONICA (Bar-tailed Godwit).

Forth—Aberlady Bay, July 30, flock of 143 adult birds, many in summer plumage; first young bird seen, Aug. 21. *Outer Hebrides*—Barra, flock of eleven "Godwits" remained all summer. *Argyll and Isles*—Tiree, Sept. 26. *Clyde*—Turnberry, June 5; Fairlie, Sept. 4.

NUMENIUS ARQUATA (Curlew).

Moray—Glen Tromie, Badenoch, to Sept. 19. *Dee*—Rattray Head, in flocks, March 5, April 24, Sept. 29; Peterhead, on migration, Sept. 4. *Argyll and Isles*—Skerryvore May 17, Aug. 15-31, Sept. 1.

NUMENIUS PHÆOPUS (Whimbrel).

Orkney—N. Ronaldshay, Aug. 3, one; Aug. 7, 8, 17, in small flocks. *Sutherland*—Brawl Castle, Aug. 3. *Forth*—Aberlady Bay, July 31, three. *Argyll and Isles*—Tiree, April 24. *Clyde*—Ailsa, March 7 (large flock), April 8; Turnberry, June 5; Cardross, Aug. 3.

STERNINÆ (Terns).

Orkney—Graemsay, May 18-Sept. 4. *S. macrura* (Arctic Tern). *Moray*—Loch Morlich, May 11, one *S. fluviatilis* (Common Tern). *Dee*—Peterhead, May 4-Sept. 14, *S. fluviatilis*. *Tay*—Tentsmuir, April 27. *Forth*—*S. fluviatilis*, Inch Mickery, May 6; Aberdour, Sept. 28; *S. macrura*, Aberlady, Oct. 7, 9; *S. dougalli* (Roseate Tern), Aberlady, July 30. *Outer Hebrides*—Barra, May 13, *S. macrura*. *Argyll and Isles*—Tiree, May 2-Aug. 25; one young bird, Oct. 7, *S. macrura*; Skerryvore, May 25, Aug. 30. *Clyde*—Pladda, Sept. 13. *S. minuta*, Turnberry, Aug. 30.

LARINÆ (Gulls).

Forth—*Xema sabinii* (Sabine's Gull), one adult, Aberlady Bay, Aug. 24; *Larus minutus* (Little Gull), Belhaven, Dunbar, Sept. 11. *Argyll and Isles*—*L. leucopterus* (Iceland Gull), Dhuheartach, Oct. 25. *Solway*—*L. minutus*, Solway Firth, Sept. 16, Oct. 9.

STERCORARIUS PARASITICUS (Buffon's Skua).

Outer Hebrides—Barra, May 12, first record.

MERGULUS ALLE (Little Auk).

Shetland—Yell, Dec. 1. *Dee*—Aberdeen, Oct. 22.

PODICIPES AURITUS (Sclavonian Grebe).

Outer Hebrides — Barra, Oct. 13. *Argyll and Isles* — Tiree, Oct. 26.

OCEANODROMA LEUCORRHOA (Fork-tailed Petrel).

Outer Hebrides — One found dead, Barra, Sept. 28.

A LIST OF SOME OF THE RARER BIRDS FOUND IN THE UPPER REACHES OF THE VALLEY OF THE AYR.

By ARCHIBALD FAIRBAIRN.

GOLDEN EYE, *Clangula glaucion*.—Early in the spring of the year 1888 I found a female specimen of this bird dead on the lower reservoir, Glenbuck. This is the only one I have observed in the locality.

GOOSANDER, *Mergus merganser*.—On 10th March 1891 I observed a specimen flying towards the east at a very low elevation. The weather was cold at the time, snow had fallen, and a sharp frost had set in.

LITTLE GREBE, *Podiceps fluviatilis*.—I shot on 15th January 1892 an example of this little diver on the river Ayr. It proved to be a female, and the first and only one that has been observed by me here.

GREAT GRAY SHRIKE, *Lanius excubitor*.—On the 29th February 1892 I shot a female specimen of this bird at Glenbuck reservoir among some willow bushes. This specimen, which is in my collection, has only one white bar on the wing, and it may also be interesting to add that the stomach contained a Short-tailed Field Mouse.

REDSTART, *Ruticilla phœnicurus*.—On the 15th April 1892 a male in full breeding plumage was observed near the river Ayr, and was the first I had noticed in the locality. Since then I have seen only one other bird of the species, also a male. It seems strange that this bird should

be so plentiful farther north, and remain in this area so very rare.

ALPINE SWIFT, *Cypselus melba*.—A bird of this species was caught, apparently exhausted, at a high window on 25th August 1892. I kept it overnight and allowed it to escape in the morning. On comparing it with good illustrations and descriptions of the Alpine Swift, I have no doubt whatever as to its proper identification.

SHELD-DRAKE, *Tadorna cornuta*.—On the 12th September 1892 I shot an immature female in a marsh near the river Ayr. It is of interest to note that the marsh in question is situated fully 24 miles from the sea-coast.

SHORT-EARED OWL, *Asio accipitrinus*.—This bird, which is somewhat rare even in autumn, has nested once to my knowledge in this district, namely during the period of the recent Vole Plague.

TAWNY OWL, *Asio otus*.—This species of Owl is also uncommon, although much is done to encourage its protection.

RAVEN, *Corvus corax*; PEREGRINE FALCON, *Falco peregrinus*; COMMON BUZZARD, *Buteo vulgaris*.—These are occasionally seen on the hills, although they do not breed.

PIED FLYCATCHER, *Muscicapa atricapilla*.—On the 22nd April 1895 a young male of this species was obtained here. It is the first and only occurrence of the Pied Flycatcher in this locality known to me. It may be of interest to note the early date, as the Spotted Flycatcher is seldom observed here before the second week of May. This fact leads me to think the bird was a wanderer, or perhaps on migration.

YELLOW WAGTAIL, *Motacilla raii*.—Has been observed for two successive years in the same field in about the second week of May. On both occasions it paid a very short visit, and was no doubt on migration.

TUFTED DUCK, *Fuligula cristata*.—On 4th May 1896 I had a very good view of a male and female of this species swimming together—and by no means shy—on a pond in this neighbourhood. About a week later I observed the female at the same place, but could not discover the male.

This is the first occurrence here of this species, so far as my observation goes.

WOOD WARBLER, *Phylloscopus sibilatrix*.—This warbler, at one time very rare, is now fairly common, but local in its distribution. At the present time several pairs are breeding here.

GRASSHOPPER WARBLER, *Locustella naevia*.—Once fairly common, now exceedingly rare. In some seasons only one or two are heard, in others none at all.

This district is in some parts very open and exposed to cold winds, which may account for the scarcity of the more delicate of the summer visitors.

WELLWOOD, MUIRKIRK, 15th June 1896.

BIRD NOTES FROM NORTH RONALDSHAY, ORKNEY.

By ALLAN BRIGGS.

Autumn 1896.

HAVING spent some seven weeks of the past autumn with my brother-in-law, Mr. Traill, in his island home, North Ronaldshay, I thought it might be of some interest to your readers to hear of the movements of birds there during the few weeks of my stay. In the first place, the weather, take it all in all, was of the worst description—very wet and stormy, the wind blowing gales first from one direction and then from another. The prevailing winds during August were more or less from the west. During September, up to the 18th, the wind blew mostly from the east or south-east, sometimes backing north of east. One of the most remarkable incidents of this autumn was the early arrival of many members of the Passeres; the first arrivals being noticed on the 2nd Sept., increasing in numbers daily up to the 12th, whereas in past seasons numbers have not come in until

early in October, as in 1893, when they bulked most from the 4th to the 9th of that month. Another remarkable feature was the almost total absence of Charadriidæ, excepting some of the commoner sorts. The Greenshank (*Totanus canescens*), the Bar-tailed Godwit (*Limosa lapponica*), the Curlew Sandpiper (*Tringa subarquata*), the Little Stint (*Tringa minuta*), being altogether absent, or at least unobserved; while the Ruff (*Machetes pugnax*) was only represented by some six individuals, and the Knot (*Tringa canutus*) by only a single specimen. It would be interesting to note if this has been the experience of other observers all along our east coast.

I arrived in North Ronaldshay with my family from the south on 1st August. On the following day I had a look round, but did not see much of interest; a number of Turnstones (*Streptilas interpres*) in breeding plumage, and a single Kestrel (*Falco tinnunculus*) being all that is worth mentioning. On the following day, 3rd Aug., Traill and myself were out after Golden Plover (*Charadrius pluvialis*). We found them more plentiful here this season than I have ever seen them, excepting the year 1892, when they were unusually numerous; the Lapwing (*Vanellus cristatus*) is also more abundant, large numbers having hatched out, as the natives inform me. On this day we saw a single Whimbrel (*Numenius phæopus*), which we secured. On 4th Aug. I found a Twite's nest (*Linota flavirostris*) on the ridge of a furrow in a potato-field; the nest, which contained four hard-set eggs, was quite exposed, as the potato shaws and other vegetation had quite died down, but it was well sunk, the rim being almost flush with the sandy soil like that of a lark's. On 7th Aug., with the wind northerly, I saw a single Pied Wagtail (*Motacilla lugubris*); it was a bird of the year, and was sitting on the sheep-dyke on the south side of the island. I shot a Whimbrel, a single bird, and also saw the first Merlin (*Falco æsalon*) of the season. I shot six Turnstones from a flock of from twenty to thirty individuals: these birds were in rather mixed plumage, much abraded on the back and scapulars. Aug. 8 was a dull, showery day. I saw two small lots of Whimbrel, three and four in each flock, but they seemed scarce here this

season, and were seldom seen except singly. One of the natives, however, a bit of a shot himself, informs me they were earlier than usual this year in their arrival ; many having been seen at the beginning of July, and large flights having occurred later on in that month. A single Phalarope (*Phalaropus hyperboreus*) was still hanging about the breeding-place, and I caught a young bird in down with the quills just beginning to show. Saw a flight of nine Teal (*Querquedula crecca*), but failed to get on terms with them. Aug. 10 proved a wet, stormy day, wind W. to S.W. I was out for a time, but saw nothing of interest except a Richardson's Skua (*Stercorarius crepidatus*) flying south over the island. Aug. 11.—Very stormy from the west, with fine rain in afternoon. Mr. Traill and myself were both out, but saw nothing special. Aug. 13.—Wet in morning, fine afternoon. Shot a single Knot from a fair-sized flock of Golden Plover ; this is the only Knot we saw this season, generally a common bird here during the latter half of August. Saw the first Sanderling (*Calidris arenaria*) among a small flock of Ring Plover ; Sanderlings were fairly common before I left on Sept. 19. Aug. 14 was a dull, breezy day ; we went out fishing in the firth. The only bird of interest we saw was a Fulmar (*Fulmarus glacialis*) which came circling close to the boat just before we stood for home in the evening. It appeared to be very dark coloured on the back, probably a young bird. Aug. 17 was a fine day, but cold. Traill and I were out all day shooting ; we saw a flock of ten Whimbrels, the only good-sized flock seen during my stay. At 10 p.m. it was blowing a gale from the south-east. Aug. 18 was a beautiful morning after the gale of last night. Four Curlews (*Numenius arquata*) along the shore of Gretchen Loch. Three Richardson's Skuas along the shore of the South Bay, two of which I secured ; they were wonderfully bold, and seemed little afraid of the sound of a gun when engaged in pursuit of a luckless Gull or Tern ; they were all of the dark variety. This Skua was very common about the island this autumn, generally in close attendance on the large flocks of Terns which frequent several well-known points of rock at low water. I only saw two of these Skuas in the black and white plumage. This same morning I saw three Ravens

(*Corvus corax*), the only birds of the species I fell in with during my visit. Saw the first Heron (*Ardea cinerea*) of the season, mobbed by half a score of Terns. Aug. 19.—Lovely day, very warm. Saw two Pied Wagtails, both immature. Large flights of Meadow Pipits (*Anthus pratensis*) all along the west side of island, over a hundred in some of the flocks. Shot a single Sand Martin (*Cotile riparia*) near a small pool of water. Saw a single Merlin; it, and indeed all hawks, were very scarce this autumn. Curlew now more plentiful; I saw a flock of at least forty. Aug. 20.—Dull day, wind S. Shot a Richardson's Skua at Bridesness; saw several others, also two Shelduck (*Tadorna cornuta*), the latter rather scarce here at this season, although several pairs breed annually. Saw five Sanderlings at Nouster along with Turnstones; of the latter there were numbers now all round the island. Saw two Kestrels (*Falco tinnunculus*). Aug. 21.—Fine day, wind west. Saw a Peregrine (*Falco peregrinus*) on west rocks. Aug. 25.—Cold, dry day; strong west wind. A Greenshank seen at the north end, the only one I heard of this season. Aug. 28.—Torrents of rain, wind south. Shot four Teal from a flock of between twenty and thirty, the only Teal I got during my stay. Aug. 29.—Showery; wind south, backing to east later on. Got a Richardson's Skua (black and white form). Aug. 30.—Wind and rain from the south-east. Aug. 31.—Better day; fair, wind still from the south or south-east. Saw seven Ruffs about the Mill Loch, two single birds and a flock of five; I bagged five of the seven, one Ruff and four Reeves. Saw a Willow Warbler (*Phylloscopus trochilus*), for the first time, among the reeds of the Mill Loch.

September 1.—Misty day; some heavy showers; wind due east. Several Willow Warblers in Holland Garden. I shot a Ruff, a single bird, at Bridesness Loch on the east side of the island. Sept. 2.—Misty in morning; fine afternoon; wind east. Wounded and lost the first Whinchat (*Pratincola rubetra*) I have had the pleasure of seeing in North Ronaldshay. Shot two Pied Flycatchers (*Muscicapa atricapilla*), and saw a third; the two I got were immature or females, indeed all I have ever seen or shot here appeared to be so. Sept. 3.—Lovely day; bright sunshine; wind

east ; a slight mist over the sea at different times during the day. Quite a great day for small birds, most of them about Holland House and Garden. In the first place I shot a Spotted Flycatcher (*Muscicapa grisola*), one of a pair ; this bird is new to our North Ronaldshay list, neither Mr. Traill nor myself having seen one before, although a bird of such sober plumage might easily escape observation. There were two, if not three, Garden Warblers (*Sylvia hortensis*) about the elder hedges ; I secured one of these, a female. On one previous occasion I had noticed this bird here (see "Annals," April 1894, p. 83). Saw a single Pied Flycatcher and a single Redstart (*Ruticilla phæniceus*), both in the garden. I also shot a female Wryneck (*Lynx torquilla*) as it was sitting on the coping stones of a wall close to the house, in the company of a Willow Warbler and a Pied Flycatcher ; perhaps all three may have been driven from the garden when we were beating the bushes and hedges shortly before. Three days later, on Sunday, 6th September, when out for a walk we saw another Wryneck ; it kept flying along a dry-stone dyke, by the side of which we were walking, always dropping on the far side of the dyke from us, until we were quite close, then skimming away again for another 70 or 80 yards, and we ultimately lost sight of it over a field of standing corn. On two former occasions the Wryneck has been taken, to my knowledge, in North Ronaldshay, both times by the late Dr. Traill, the last being in 1880 or 1881. A single Swift (*Cypselus apus*) kept circling round the house for an hour or two in the afternoon, and later on in the evening six House Martins (*Chelidon urbica*) arrived ; I shot one of the latter to make sure of its identification. I may say here that I have never yet identified the swallow (*Hirundo rustica*) in this island. Several Willow Warblers in the garden towards evening. Willow Warblers, although never very plentiful this season, were still common, as from their first appearance on 31st Aug. to the day of our departure on 19th Sept. there were always a few to be seen about the island wherever there was a bit of cover. Although well looked out for, there was no sign of the Chiffchaff (*Phylloscopus collybita*) this season ; only twice have I fallen in with it here, viz. 1893, when I got one on 16th and another

on the 23rd Oct. (see "Annals" for April 1894, p. 83).
Sept. 5.—Cold, dry day ; wind north. Saw a Martin and a Sand Martin together hawking for insects over the Mill Loch. A Song Thrush (*Turdus musicus*), and a small Warbler I could not make out, in the garden to-night. Sept. 7.—Dry day ; wind N.E. Several small birds in garden ; two Garden Warblers, one Blackcap (*Sylvia atricapilla*) immature, several Willow Warblers, and a single Whitethroat (*Sylvia cinerea*)—the last mentioned rather a rare bird here in my estimation, and in Messrs. Harvie-Brown and Buckley's "Fauna of the Orkney Islands" they give nothing but the statement by Morris of the bird shot on Sanday by the late Mr. Strang. This season the Whitethroat has been, comparatively speaking, common here during the latter part of our stay, from 7th Sept. to 19th Sept., two and three being seen at times together. While Snipe shooting this afternoon in the Mill Loch, along with Mr. Traill, we disturbed a bird from the edge of the loch, which, as it flew straight from me, I at first took to be a White Owl ; Traill, who saw it sideways, shouted out that it was an Egret. The bird settled in a patch of rushes across the loch. We followed it up, keeping slightly apart. It rose to me, a cross shot, but wild, and the bird dropped to shot apparently dead. Next instant it was up again, and flew to the far end of the loch, to all appearance not much the worse for the shot, alighting this time close to a dry-stone dyke. My brother-in-law remained in the loch hidden among the reeds, and I, after a very long roundabout stalk, came up to the back of the dyke. The bird rose within 20 yards, and I did not fail to secure him ; he proved to be a Squacco Heron (*Ardea ralloides*), an old male in almost perfect plumage. This certainly is an addition to the Orkney fauna, and a rare bird for Scotland ; Yarrell, fourth edition, recording only two examples as having been taken in the country within the last forty years or so. Sept. 8.—Dry, cold day ; wind E.S.E. Shot the first Wigeon (*Mareca penelope*) of the season on Gretchen Loch, a single bird, an old female. A Whitethroat, a Redstart, and a Willow Warbler in garden. Sept. 9.—Day cold and dry ; wind from the E. or N.E. Shot an immature Blackcap ; it was along with a dozen or so Rock Pipits. Got two Jack Snipe

(*Gallinago gallinula*), the only ones seen and the first for the year. Sept. 10.—Damp, cold day; wind S.E. Shot two old male Redstarts and two Whinchats, the latter being birds of the year. Sept. 11.—Dull day; wet and misty in afternoon; wind S.E. Garden Warbler, Pied Flycatcher, female Redstart, several Willow Wrens, and a Robin (*Erithacus rubecula*) in garden. Sept. 12.—Stormy; heavy rain showers throughout the morning; very wet afternoon; wind S.E. Swarms of Redstarts in the garden and all along the west side of the island; I never remember to have seen anything like it. We generally see a few Redstarts every season, but this was a regular rush; the red tails were flirting by the dozen along every dyke side, and every large boulder on the beach sheltered one or more. They were almost entirely young birds, as far as I could make out. Among the host of Redstarts were many other Passeres, but owing to the blinding rain it was difficult either to identify or shoot many of the little creatures, which were blown about like leaves among the boulders and stones on the beach by every gust of wind, or went jinking out and in about the open stonework of the dykes; however, I made out Song Thrush (one), Robin (one), several Pied Flycatchers, several Whitethroats, Whinchat (one). I shot a fine old male Blackcap, the only bird of the kind with a black head I have met with here, the brown-headed birds being frequently seen in late autumn. I also shot a female Tree Pipit (*Anthus trivialis*), this being the first time I have met with the species in this island. A good many immature Pied Wagtails were among this rush of birds. Sept. 13, Sunday.—Better weather, sunshine at times. Birds in garden: Pied Flycatchers, Willow Warblers, Whitethroats, one Robin, one Blackcap, numbers of Redstarts. Out for a walk with my wife and Traill, we saw three Tree Pipits together, between the house and the west rocks, identified for certain through the binoculars at a close range. Sept. 14.—Misty morning; heavy rain in afternoon. Traill and myself were both out and tried different directions. Traill killed a fine old cock Goldcrest (*Regulus cristatus*); it was by itself along the side of the west sheep-dyke. He also secured two fine old male Redstarts. A single Swift was again about the house and farm buildings at 11 o'clock in the forenoon,

joined a little later by two House Martins. A single Chaffinch (*Fringilla cœlebs*) in the garden. Sept. 16.—Damp morning; frequent showers; the wind rose towards afternoon, and by 12 P.M. it was blowing a perfect gale from the S.S.W. I shot a Tree Pipit; it was alone and on the ground, apparently seeking for food, when I came on it. Still a few Redstarts and Willow Wrens and a single immature Blackcap haunting the garden. Sept. 17.—Dull morning; very wet afternoon; wind S., and at 10.30 P.M. blowing strong from the S.E. Traill, who returned from Sanday this morning, informs me that several lots of small birds passed close to his boat, heading south; he could not determine the species. Sept. 18.—Wind S.W.; very stormy in morning; moderate towards afternoon. Traill and myself noticed a small gray bird in the garden this morning; it was very wary, and kept well in cover. After rather a protracted pursuit all over the place, I managed to get a shot and secured a Lesser Whitethroat (*Sylvia curruca*); I fancy this is new to Orkney, as I can find no mention of it in Messrs. Harvie-Brown and Buckley's "Fauna." The bird on dissection proved to be a female. I find, however, that I have the skin of a Lesser Whitethroat shot by myself in North Ronaldshay, dated 4th Oct. 1893. These are the only two of the species that have come under my notice. Sept. 19.—Day fine, with very little wind. Crossed the firth to Sanday on our way home. In the morning, before leaving the island, I had a last look round the garden. The only strangers I saw were two Redstarts and a Willow Warbler. On 6th Oct. D. Knight, Mr. Traill's man, shot a Pink-footed Goose (*Anser brachyrhynchus*); the bird was alone when shot. It was sent on to St. Andrews, where I saw it; it appeared to be an old bird, but was in too high a state to be of use. This species would appear to be of rare occurrence in the Orkneys, Messrs. Harvie-Brown and Buckley in their "Fauna" only mentioning three different occasions on which it had been seen.

NOTES ON THE NESTING OF THE GREAT
CRESTED GREBE (*PODICIPES CRISTATUS*)
IN THE VALLEY OF THE FORTH.

By OSWIN A. J. LEE.

IN the spring of 1895 I observed a pair of Great Crested Grebes on the Lake of Monteith, but failed to locate their nest.

On the 28th of April 1896, however, I arrived at the lake, determined to find the nest, if it was there again, and was rewarded by seeing a fine male in full breeding plumage diving about near a large reed-bed in the north-east end of the lake. He was very tame, and allowed me to row within thirty yards of him without paying the slightest attention to me, so that I had ample leisure to admire him through my glasses. I failed, however, to find the nest that day.

On the morning of the 29th I started early to find the nest, as I was quite sure that the female was sitting on eggs not far off. I commenced operations by beating up the reed-bed. As I came close to a swan's nest among the reeds, I saw a tell-tale ripple and line of bubbles running out from a point in the reeds, just like some large pike making off to the deep water, and to my delight the female Great Crested Grebe appeared about seventy yards off. In less than three minutes I found the nest. It was rather an insignificant-looking pile of dead reed stems, half decayed weeds, and pieces of young water lily leaves,—the latter evidently freshly plucked,—floating in about two feet of water among the tall reeds and anchored to them. It contained two perfectly fresh eggs, which were carefully covered up and felt quite warm. The day was bright but rather windy, so I did not try to photograph the nest, but devoted my attentions to watching the birds.

After disposing of my boat at a little distance, I waded in among the reeds and secreted myself behind a thick clump about fifteen yards from the nest. I could see the

two Grebes out in the open about seventy-five or eighty yards off; they sat low in the water, and swam about at a great pace. The male would occasionally swim round and round his mate, ducking his head and bobbing it up and down, every now and then striking the water with a single stroke of his wings; the female, however, paid but little attention to his blandishments, as her eye was fixed on the vicinity of the nest. They swam about in the same spot for nearly half an hour, sometimes diving for pieces of green weed, which they tore to pieces on the surface, and sometimes toying with each other.

Just as my patience was becoming exhausted, the female swam closer in shore, and, after looking cautiously about, she dived. I kept my eyes glued on the nest. Suddenly she appeared about three feet from the nest, but must have caught sight of me, as she dived almost immediately and reappeared about forty yards out. I noiselessly changed my position, getting farther behind the clump of reeds. In about fifteen minutes she suddenly appeared again beside the nest, and, after a hurried look round, got on to it and carefully uncovered the eggs, arranging all the weeds on the nest before she finally turned the eggs with her bill and settled herself on them. The male appeared almost immediately about six feet from the nest, on the side nearest me, with a young water lily leaf which had not yet unrolled itself; this he deposited on the side of the nest, the female giving it two or three playful dabs with her bill. During the short time that the male was at the nest, he kept up a sort of crooning noise, difficult to describe on paper, but resembling somewhat the syllables "Krrrāw-quāw-quāw, krrraw-quaw-quaw," repeated very slowly over and over again, and continually bobbed his head up and down. After he dived away the female composed herself to rest and buried her head among her feathers.

By this time I was getting very cold and stiff, as I had been standing there about two hours, over my knees in water, without waders. Keeping my eye on the sitting bird, I made a slight movement; she jumped up and hurriedly covered up the eggs with some of the weeds on the nest, remaining bolt upright with her head erect and listening

intently as if she had not spotted me. On my next movement she dived noiselessly into the water and appeared some sixty yards off right out in the open. I was so cold and stiff that I could hardly wade ashore, but I was amply rewarded by my glimpse at the habits of these beautiful birds at their nest.

On the morning of the 30th there were three eggs in the nest, and on the 1st of May another egg was laid. On each occasion I found fresh water lily leaves on the side of the nest, but no trace of any withered ones! Can they have been used as food?

LEPIDOPTERA IN ROXBURGHSHIRE.

By ADAM ELLIOT.

AS it might perhaps be of considerable interest to Entomologists, those at any rate who give their attention to the order of the Lepidoptera, to have authentic county lists of the species occurring throughout the Scottish counties, as showing their distribution, I have here noted the species of Lepidoptera I have myself taken in Roxburghshire—*five* species excepted: four of these having been casually come upon by friends and kindly given to me alive at the time of capture, and one, viz. *Colias edusa*, several specimens of which were taken by a friend in this district, and I have myself seen this species on the wing in the western district of the county. The bulk of the species noted have been taken in the perfect or imago state, while a number in each group, and in the division of the Micro-Lepidoptera, have been reared from eggs or larvæ. I may say that in every instance when I have had the slightest doubt as to the correct identification of species, the specimens have been seen, and their identification made or confirmed, by Mr. C. G. Barrett. It is necessary, I think, in recording Lepidoptera, that the specimens should *themselves be in evidence*, by being in the collector's possession, otherwise the mere reports of the capture of species frequently turn out unre-

liable, and consequently of no value. Possession, therefore, should be a *sine qua non*. It has been the fashion of late to manufacture in rather a wholesale way synonyms for the older names of insects, which generally would have been much better left alone; and the nomenclatures used by entomologists of such eminence as the late Mr. H. T. Stainton, I think, should be a good example. It would take up far too much space to here give specific detail and notes of the capture and rearing of the larvæ, etc., of many interesting species enumerated in the list. I may say, however, that some species being very recurrent in appearance, when opportunity offers by a good species turning up, a good old axiom should be kept in view, and a series secured at the time, as a like opportunity may not come again to the collector for many years, if at all. I once found *Ino statices* flying plentifully in the sunshine on the grassy bank of a burn-side, *Aspilates strigillaria* in the glade of a moorland young plantation, and *Nemeophila plantaginis* in numbers on a spot of moorland; but all these species I have not again seen, and I fortunately secured some specimens of each. I used to take *Lycæna Alsus* in the south-western district, and associated with it *Artaxerxes*, and later in the same locality *Erebia blandina*. *Alsus* I have never seen in any other district of the county, but have met with the two last named in the eastern district. I need scarcely say that perfect condition in specimens of Lepidoptera is of the utmost importance, and one of the best ways of attaining this is by rearing from the eggs or larvæ; and indeed many species are not easily obtained in any other way. Besides being a means of obtaining perfect specimens, there is much of interest to note, such as the times, or periods of the day, of emergence from the chrysalis of the different species—a subject which seems to have received very little attention from entomologists. At one time I bred a number of well-known species successively for several years, principally from the families of the *Sphingidæ* and of the *Notodontidæ*, under as uniform conditions as possible, noting the time of emergence of the different species, which was singularly uniform as to time or periods of the day in which they emerged. There are two periods of the day in which most

species emerge, viz. from 7 to 10 A.M., and again from 5 to 8 or 9 P.M.; and in my experience in successive years, the same species emerged within the same hours. As is well known, Lepidoptera can be abnormally forced to emerge from the chrysalis state by artificial conditions of heat and moisture; and I have forced specimens of *Smerinthus populi* and *tiliæ* and other summer species in the month of January, but any rule of emergence under such artificial conditions will probably not hold good. I may say that the forced specimens were normal, excepting in colour, which is usually paler. Following is the list:—

RHOPALOCERA.

PIERIDÆ.

Colias edusa, *F.*
Pieris brassicæ, *L.*
 „ *rapæ*, *L.*
 „ *napi*, *L.*
Anthocharis cardamines, *L.*

SATYRIDÆ.

Satyrus semele, *L.*
 „ *Janira*, *L.*
 „ *Hyperanthus*, *L.*
Erebia Blandina, *F.*
Cænonympha Pamphilus, *L.*

VANESEIDÆ.

Vanessa cardui, *L.*
 „ *Atalanta*, *L.*
 „ *Io*, *L.*
 „ *urticæ*, *L.*

ARGYNNIDÆ.

Melitæa artemis, *S. V.*

LYCÆNIDÆ.

Polyommatus phlæas, *L.*
Lycæna Alsus, *S. V.*
 „ *Alexis*, *S. V.*
 „ *Artaxerxes*, *F.*

HETEROCERA.

SPHINGES.

ZYGÆNIDÆ.

Ino statices, *L.*

SPHINGIDÆ.

Smerinthus populi, *L.*
 „ *tiliæ*, *L.*
Acherontia atropos, *L.*

Sphinx convolvuli, *L.*
Chærocampa celerio, *L.*
 „ *porcellus*, *L.*
Macroglossa stellatarum, *L.*
 „ *bombyliformis*, *O.*

SESIIDÆ.

Trochilium bembeciforme, *H.*

BOMBYCES.

EPIALIDÆ.

- Epialus lupulinus*, *L.*
 „ *humuli*, *L.*
 „ *velleda*, *H.*
 „ *sylvanus*, *L.*

NOTODONTIDÆ.

- Harpyia furcula*, *L.*
 „ *vinula*, *L.*
Notodonta dromedarius, *L.*
 „ *ziczac*, *L.*
Pterostoma palpina, *L.*
Leiocampa dictæa, *L.*
 „ *dictæoides*, *E.*
Lophopteryx camelina, *L.*
Pygæra bucephala, *L.*

LIPARIDÆ.

- Demas coryli*, *L.*
Orgyia antiqua, *L.*

LITHOSIDÆ.

- Nudaria mundana*, *L.*

CHELONIDÆ.

- Arctia caia*, *L.*
Nemeophila plantaginis, *L.*
Spilosoma fuliginosa, *L.*
 „ *menthastri*, *S. V.*
Euchelia jacobææ, *L.*

BOMBYCIDÆ.

- Bombyx rubi*, *L.*
 „ *quercus*, *var. calluna*
 „ *populi*, *L.*

SATURNIDÆ.

- Saturnia carpini*, *S. V.*

DREPANULIDÆ.

- Cilix spinula*, *S. V.*

NOCTUÆ.

CYMATOPHORIDÆ.

- Thyatira batis*, *L.*
Acronycta psi, *L.*
 „ *ligustri*, *S. V.*

LEUCANIDÆ.

- Leucania conigera*, *S. V.*
 „ *lithargyria*, *E.*
 „ *comma*, *L.*
 „ *impura*, *H.*
 „ *pallens*, *L.*
Nonagria fulva, *H.*
 „ *lutosa*, *H.*

APAMIDÆ.

- Hydroecia nictitans*, *L.*
 „ *micacea*, *E.*
Xylophasia rurea, *F.*
 „ *lithoxylea*, *S. V.*
 „ *polyodon*, *L.*

- Charæas graminis*, *L.*
Luperina testacea, *S. V.*
Mamestra furva, *S. V.*
 „ *brassicæ*, *L.*
Apamea basilinea, *S. V.*
 „ *gemina*, *H.*
 „ *oculea*, *F.*
Miana strigilis, *L.*
 „ *fasciuncula*, *Hw.*
 „ *literosa*, *Hw.*
Celæna Haworthii, *C.*

CARADRINIDÆ.

- Caradrina blanda*, *H.*
 „ *cubicularis*, *S. V.*

NOCTUIDÆ.

- Rusina tenebrosa*, *H.*
Agrotis suffusa, *S. V.*
 „ *segetum*, *S. V.*
 „ *exclamationis*, *L.*

Agrotis porphyrea, *S. V.*
Tryphæna ianthina, *S. V.*
 ,, *fimbria*, *L.*
 ,, *subsequa*, *S. V.*
 ,, *orbona*, *F.*
 ,, *pronuba*, *L.*
Noctua glareosa, *E.*
 ,, *depuncta*, *L.*
 ,, *augur*, *F.*
 ,, *pecta*, *L.*
 ,, *c-nigrum*, *L.*
 ,, *triangulum*, *Hf.*
 ,, *brunnea*, *S. V.*
 ,, *festiva*, *S. V.*
 ,, *conflua*, *T.*
 ,, *rubi*, *View.*
 ,, *umbrosa*, *H.*
 ,, *baia*, *S. V.*
 ,, *xanthographa*, *S. V.*

ORTHOSIDÆ.

Trachea piniperda, *Panz.*
Tæniocampa gothica, *L.*
 ,, *rubricosa*, *F.*
 ,, *instabilis*, *E.*
 ,, *stabilis*, *View.*
Orthosia suspecta, *H.*
 ,, *upsilon*, *S. V.*
 ,, *lota*, *L.*
 ,, *macilenta*, *H.*
Anchocelis lunosa, *Hw.*
 ,, *litura*, *L.*
Orrhodia vaccinii, *L.*
 ,, *spadicea*, *G.*
Scopelosoma satellitia, *L.*
Xanthia fulvago, *L.*
 ,, *silago*, *H.*
 ,, *ferruginea*, *S. V.*

COSMIDÆ.

Tethea subtusa, *S. V.*

HADENIDÆ.

Dianthœcia carpophaga, *Bh.*
 ,, *capsincola*, *S. V.*
 ,, *cucubali*, *S. V.*
Hecatera serena, *S. V.*

Polia chi, *L.*
Epunda lutulenta, *S. V.*
 ,, *viminalis*, *F.*
Miselia oxyacanthæ, *L.*
Dichonia aprilina, *L.*
Phlogophora meticulosa, *L.*
Euplexia lucipara, *L.*
Aplecta herbida, *S. V.*
 ,, *occulta*, *L.*
Hadena adusta, *E.*
 ,, *protea*, *S. V.*
 ,, *dentina*, *S. V.*
 ,, *oleracea*, *L.*
 ,, *pisi*, *L.*
 ,, *thallasina*, *Bh.*
 ,, *rectilinea*, *E.*

XYLINIDÆ.

Calocampa vetusta, *H.*
 ,, *exoleta*, *L.*
Cucullia umbratica, *L.*

HELIOTHIDÆ

Anarta myrtilli, *L.*

PLUSIIDÆ.

Habrostola urticæ, *H.*
Plusia chrysitis, *L.*
 ,, *bractea*, *S. V.*
 ,, *festuæ*, *L.*
 ,, *iota*, *L.*
 ,, *v-aureum*, *G.*
 ,, *gamma*, *L.*
 ,, *interrogationis*, *L.*

GONOPTERIDÆ

Gonoptera libatrix, *L.*

AMPHIPYRIDÆ.

Amphipyra tragopogonis, *L.*
Nænia typica, *L.*
Mania maura, *L.*

EUCLIDIDÆ.

Euclidia mi, *L.*
 ,, *glyphica*, *L.*

POAPHILIDÆ.

Phytometra ænea, *S. V.*

GEOMETRINA.

ENNOMIDÆ.

- Rumia cratægata, *L.*
 Metrocampa margaritata, *L.*
 Ellopia fasciaria, *L.*
 Selenia illunaria, *H.*
 Odontopera bidentata, *L.*
 Crocallis elinguaris, *L.*
 Ennomos tiliaria, *Bh.*
 Himera pennaria, *L.*

AMPHIDASIDÆ.

- Phigalia pilosaria, *S. V.*
 Amphidasia betularia, *L.*

BOARMIDÆ.

- Cleora lichenaria, *Hf.*
 Boarmia repandata, *L.*
 „ rhomboidaria, *S. V.*

ACIDALIDÆ.

- Venusia cambrica, *C.*
 Acidalia aversata, *L.*

CABERIDÆ.

- Cabera pusaria, *L.*

MACARIDÆ.

- Macaria liturata, *L.*
 Halia wavaria, *L.*

FIDONIDÆ.

- Scodionia belgiaria, *H.*
 Fidonia atomaria, *L.*
 „ piniaria, *L.*
 Aspilates strigillaria, *H.*

ZERENIDÆ.

- Abraxas grossulariata, *L.*

HYBERNIDÆ.

- Hybernia rupicapraris, *S. V.*
 „ aurantiaria, *H.*

- Hybernia progemmaria, *H.*
 „ defoliaria, *L.*
 Anisopteryx æscularia, *S. V.*

LARENTIDÆ.

- Cheimatobia brumata, *L.*
 „ boreata, *H.*
 Oporabia dilutata, *S. V.*
 „ autumnaria, *G.*
 „ filigrammaria, *H. S.*
 Larentia didymata, *L.*
 „ multistrigaria, *Hw.*
 „ cæsiata, *Lang.*
 „ salicata, *H.*
 „ pectinitaria
 Emmelesia alchemillata, *L.*
 „ albulata, *S. V.*
 „ decolorata, *H.*
 Eupithecia subfulvata, *Hw.*
 „ pygmæata, *H.*
 „ satyrata, *H.*
 „ castigata, *H.*
 „ indigata, *H.*
 „ nanata, *H.*
 „ vulgata, *Hw.*
 „ tenuiata, *H.*
 „ exigua, *H.*
 „ sobrinata, *H.*
 „ togata, *H.*
 „ rectangulata, *L.*
 Thera variata, *S. V.*
 „ firmata, *H.*
 Hypsipetes impluviata, *S. V.*
 „ elutata, *H.*
 Melanthia ocellata, *L.*
 Melanippe tristata, *L.*
 „ biriviata, *Bh.*
 „ montanata, *S. V.*
 „ fluctuata, *L.*
 Anticlea badiata, *S. V.*
 „ derivata, *S. V.*
 Coremia munitata, *H.*
 „ propugnata, *S. V.*
 „ ferrugata, *L.*

Camptogramma bilineata, <i>L.</i>	Cidaria populata, <i>S. V.</i>
Scotosia dubitata, <i>L.</i>	„ fulvata, <i>Forst.</i>
Cidaria psittacata, <i>S. V.</i>	„ pyraliata, <i>S. V.</i>
„ miata, <i>L.</i>	
„ corylata, <i>Thnb.</i>	EUBOLIDÆ.
„ russata, <i>S. V.</i> , and <i>vars.</i>	
„ immanata, <i>Hw.</i>	Eubolia mensuraria, <i>S. V.</i>
„ suffumata, <i>S. V.</i> , and <i>var.</i>	„ plumbaria, <i>F.</i>
„ piceata.	Anaitis plagiata, <i>L.</i>
„ prunata, <i>L.</i>	Chesias spartiata, <i>Fuess.</i>
„ testata, <i>L.</i>	Odezia chærophyllata, <i>L.</i>

DELTOIDES.

HYPENIDÆ.—Hypena proboscidalis, *L.*

PYRALIDES.

ENNYCHIDÆ.

Herbula cespitalis, *S. V.*

BOTYDÆ.

Botys fuscalis, *S. V.*
 Pionea forficalis, *L.*
 Scopula lutealis, *H.*
 „ prunalis, *S. V.*
 Nomophila hybridalis, *H.*

CHOREUTIDÆ.

Simaethis fabriciana, *L.*
 „ pariana, *L.*

EUDORIDÆ.

Scoparia atomalis, *Dß.*
 „ ambigualis, *T.*
 „ pyralella, *H.*
 „ cratægella, *H.*
 „ murana, *C.*

GALLERIDÆ.

Aphomia sociella, *L.*
 Hypochalcia ahenella, *S. V.*

CRAMBIDÆ.

Crambus pratellus, *Clk. Dß.*
 „ hortuellus, *H.*
 „ culmellus, *L.*
 „ tristellus, *S. V.*

TORTRICINA.

TORTRICIDÆ.

Amphysa gerningiana, *S. V.*
 Hypermeria angustana, *H.*
 Tortrix icterana, *Fröhl.*
 „ viburnana, *S. V.*
 „ viridana, *L.*
 „ Forsterana, *F.*
 „ heparana, *S. V.*

PLICATÆ.

Lozotænia musculana, *H.*
 Batodes angustiorana, *Hw.*
 Ptycholoma Lecheana, *L.*
 Spilonota trimaculana, *Hw.*
 Catoptria cana, *Hw.*
 Halonota bimaculana, *Dnv.*
 „ trigeminana, *Ss.*

Halonota cirsiana, *Z.*
 „ *scutulana*, *S. V.*
 „ *brunnichiana*, *S. V.*
Dicrorampha petiverella, *L.*
 „ *politana*, *S. V.*
 „ *herbosana*, *Bar.*
Coccyx hyrciniana, *Uslar.*

ANCHYLOPERIDÆ.

Spilonota neglectana, *D.*
Anchylopera myrtillana, *T.*
 „ *unguicella*, *L.*
Bactra lanceolana, *H.*
Argyrotoza Conwayana, *F.*
Hemerostia rheediella, *L.*

PERONEIDÆ.

Cheimatophila mixtana, *H.*
Peronea tristana, *H.*
 „ *aspersana*, *H.*
 „ *maccana*, *T.*
 „ *variegana*, *S. V.*
 „ *Caledoniana*, *St.*
 „ *ferrugana*, *S. V.*
Teras caudana, *F.*

STIGMONOTIDÆ.

Pœcilochroma corticana, *H.*
Retinia pinivorana, *Z.*
 „ *sylvestrana*, *C.*
Pamplusia monticolana, *D.*

CNEPHASIDÆ.

Sciaphila virgaureana, *T.*
 „ *octomaculana*, *C.*
Aphelia pratana, *H.*

SERICORIDÆ.

Sericoris rivulana, *S.*
 „ *lacunana*, *S. V.*
Mixodia Schulziana, *F.*

LOZOPERIDÆ.

Argyrolepis cnicana, *Db.*
Eupœcilia atricapitana, *Ss.*
 „ *angustana*, *H.*
 „ *ciliella*, *H.*
Cochytis straminea, *Hw.*
Xanthosetia hamana, *L.*
 „ *zægana*, *L.*

TINEINA.

EXAPATIDÆ.

Chimabacche fagella, *W. V.*
Ochsenheimeria birdella, *C.*
Tinea rusticella, *H.*
 „ *tapetzella*, *L.*
 „ *cloacella*, *Hw.*
 „ *pellionella*, *L.*
 „ *semifulvella*, *Hw.*
 „ *supella*.
Incurvaria masculella, *F.*
Nemophora schwarziella, *Z.*

MICROPTERYGIDÆ.

Micropteryx subpurpurella, *Hw.*

HYPONOMEUTIDÆ.

Swammerdamia apiella, *Dnv.*
 „ *pyrella*, *Vill.*

PLUTELLIDÆ.

Plutella cruciferarum, *Z.*
 „ *porrectella*, *L.*
 „ *dalella*, *Stn.*
Cerostoma vittella, *L.*
 „ *radiatella*, *Dnv.*

GELECHIDÆ.

Depressaria costosa, *Hw.*
 „ *assimilella*, *T.*
 „ *alstræmeriana*, *Cl.*
 „ *arenella*, *W. V.*
 „ *applana*, *F.*
 „ *nervosa*, *Hw.*
 „ *heracliana*, *De Geer.*
Gelechia confinis, *Stn.*
 „ *ericetella*, *H.*

Gelechia terrella, *W. V.*

„ *acuminatella*, *Sircom.*

Pleurota bicostella, *L.*

ÆCOPHORIDÆ.

Æcophora subaquilea, *Stn.*

„ *pseudospretella*, *Stn.*

Endrosis fenestrella, *S.*

GLYPHIPTERYGIDÆ.

Glyphipteryx thrasonella, *S.*

„ *fuscoviridella*, *Hw.*

„ *fischeriella*, *Z.*

ARGYRESTHIDÆ.

Argyresthia nitidella, *F.*

„ *retinella*, *Z.*

„ *goedartella*, *L.*

„ *arceuthina*, *Z.*

Cedestis farinatella, *D.*

GRACILARIDÆ.

Gracilaria swederella, *Thnbg.*

„ *tringipennella*, *Z.*

„ *syringella*, *F.*

„ *phasianipennella*, *H.*

COLEOPHORIDÆ.

Coleophora albicosta, *Hw.*

„ *artemisiella*, *Scott.*

ELACHISTIDÆ.

Chauliodus chærophylllellus,
Goeze.

Elachista apicipunctella, *Stn.*

„ *atricomella*, *Stn.*

„ *rufocinerea*, *Hw.*

„ *cygnipennella*, *H.*

LITHOCOLLETIDÆ.

Lithocolletis spinolella, *D.*

„ *coryli*, *Nicelli.*

PTEROPHORINA.

Platypilus Bertrami, *Rössler.*

Pterophorus bipunctidactylus,
Hw.

„ *microdactylus*, *H.*

Acipitilus tetradactylus, *L.*

ALUCITINA.

Alucita polydactyla, *H.*

GALLS.

By Prof. JAMES W. H. TRAIL, M.A., M.D., F.R.S.

TWENTY-FIVE years have elapsed since I began to describe, in the early volumes of the "Scottish Naturalist," the galls found by myself in N.E. and central Scotland, or sent me by friends from various parts of the country. The earlier papers were issued at a time when information as to the makers of these productions was not easily acquired. In later papers in the same journal, and in the publications of the Natural History Societies of Aberdeen and Perth, I have supple-

mented their deficiencies by descriptions of galls not previously on record from Scotland, and by giving names of others the makers of which had not been previously identified. That the observations were fairly thorough may be inferred from the fact that in the districts most wrought by me I have found very few novelties for a good many years past. The district around Glasgow, and, to a less extent, some other regions in the West of Scotland, have had their galls investigated by Mr. Peter Cameron, whose discoveries are recorded largely in the publications of Glasgow Natural History Societies, as well as in the "Scottish Naturalist," the "Entomologist's Monthly Magazine," and other scientific journals. The true Gall-flies, or *Cynipidæ*, and the Gall-making Saw-flies, have been well treated of in Mr. Cameron's great work in four volumes (issued by the Ray Society), under the name of "The British Phytophagous Hymenoptera." Mr. F. G. Binnie, in 1876, published in the Transactions of the Glasgow Societies some short but valuable papers on the *Cecidomyidæ*, or Gall-midges, of the neighbourhood of Glasgow.

For a good many years very little additional information has been published about the galls of Scotland, or indeed of any part of the British Islands; and the few notes that have appeared are apt to be overlooked in the absence of any index to the very scattered literature of the subject. Though the galls of a very few districts have been collected with some care, and described with sufficient fulness to permit their recognition in most cases, these districts form but a very small part of our islands; and very little, if anything, is on record about the distribution of the gall-makers in Britain as a whole.

During the past two decades much has been done on the continent of Europe in the careful investigation of the life-histories and of the structure of the gall-makers, especially of the less conspicuous forms produced by nematoid worms, mites, and midges; and our earlier British records demand reconsideration in the light of this fuller information. I have for some time been engaged in collecting all the information I can obtain upon galls, in the hope of being able to bring our knowledge of the galls of the British

islands into line with that of the galls of Central Europe and Italy. I also hope to be able to extend our records of the distribution of the gall-makers in our country. I ask the co-operation of all who may observe galls to aid me in this by kindly forwarding to me examples of the various forms, fresh or dried. Each specimen should be labelled with the name of the food-plant (unless the part sent is sufficient to show this), the collector's name, the locality, the approximate height above the sea-level, and the date. I will gladly supply the names of the makers if it is possible to do so. It will make this easier if the sender will number each kind sent, retaining an example bearing the same number. Examples from almost any locality in the country will be welcome, no matter how common they appear to be. So little is recorded as to the distribution that every scrap of information will be helpful.

Galls form a most interesting subject of study. The power that certain low forms of plants and many animals, belonging to widely different groups, possess of influencing the growth of the cells of their hosts so as to give rise to structures usually of a very definite nature is one that man has not yet been able to acquire, even in a limited degree. The change produced is in most cases so characteristic that the galls can be recognised with as great certainty as, and with far greater ease than, the gall-makers themselves. Indeed, in a good many cases, for example among certain *Cynipidæ*, the gall-makers can scarcely be distinguished from one another, while the galls are very different. A continuous gradation leads from galls that are little more than a slight enlargement of the part, or a mere surface distortion, to those so highly specialised in form, and of so varied tissues, that they appear like wholly new parts not represented in the normal organs of the plant.

A clear and accurate conception of the nature of the change induced by the gall-maker in the processes of nutrition and of growth characteristic of the healthy cells would be a most valuable contribution to our knowledge of physiology. In the simplest galls, often scarcely deserving the name, this change is probably due to local irritation caused by the parasites absorbing their food from the

affected cells. Such galls are almost always formed by parasites (such as many Gall-mites and some Aphides) for their own protection and nourishment. The alterations in these forms frequently amount, as stated above, to little more than an enlargement of the cells of the ground-tissue or of the epidermal cells, with sometimes an increase in their numbers. Hairs often grow from the surface, in small numbers and scattered, or so abundantly as to form conspicuous patches. These have frequently been described as fungi, usually under the supposed genera *Erineum* and *Phyllerium*. These galls belong to a somewhat specialised type in that the hairs in each kind are very seldom like those usually found on the host plant, while they show forms characteristic of the galls.

Very different, at least in degree, from the influence exerted by the parasite in both these cases, must be that in force in the production of such galls as those formed on oaks by the true gall-flies; and the difference is increased by the fact that so many of these insects produce in each year two galls absolutely distinct in aspect, and often very different in structure. Yet these highly developed galls only manifest in an extreme degree a power that in its less specialised stages is possessed by many other insects, as well as by organisms of numerous types lower than insects in the scale of being.

There does not appear to be any reason why man should not discover how to exercise some such power over nutrition and growth of parts so as to modify structure profoundly. The importance of such a discovery in its scientific interest and in its practical applications is self-evident.

The subject of Galls is far too large to be treated in its fulness here; but an outline of it may help to induce readers to look for them, and to respond kindly to my request for assistance in the form of specimens.

It is somewhat difficult to define clearly what a gall is, so as to include the widely different forms with which we meet. But it may practically be accepted as any structure in which the action of a parasite has led to increase in size of the tissues of the host. The enlarged tissues very generally show marked increase in the number of the cells, along with enlargement of the individual cells, and (in the

more highly specialised galls) often a great diversity in structure, uses, and contents among the constituent cells. In this sense galls may be said to occur on animals as well as on plants; but the galls on animals are comparatively few, and need not be considered here. Passing to plants as hosts, we meet with galls, necessarily of very simple structure, even among some of the Algæ or water-weeds, *e.g.* in a few red sea-weeds, and in species of the green freshwater weed *Vaucheria*, which bear flask-shaped galls caused by a Rotifer—*Notomma Werneckii*. But the whole number of galls on flowerless plants is very small, even the ferns and their allies bearing but few, and of a structure but little specialised. Many of the flowering plants, on the other hand, show a very wide range of structure and form in the galls they bear. By far the most specialised forms known to us occur on some of the Dicotyledons. It is curious to find that the Gymnosperms show a far less development of galls, alike in structure and in frequency, than do the Angiosperms, or flowering plants with closed seed-vessels, though they so long preceded the latter plants in their appearance on the earth's surface. Among the Angiosperms, the two great divisions of Monocotyledons and Dicotyledons present a similar inequality; the former division, though the earlier to appear in the earth's history, being by far behind the other in the complexity of structure reached by the galls, and also in the number of kinds of gall-makers in comparison with the number of species of plants in each division. Certain orders of Dicotyledons are very susceptible to attacks of gall-makers, every species bearing one or more kinds. Pre-eminent alike in number of forms, in high specialisation of many of the galls, and in the prevalence of dimorphism (or two forms of a single species in successive generations within the year producing two forms of galls), stand the Oaks. The other genera (beech, hornbeam, and hazel) of the family of Cupuliferæ are also more or less infested by galls. The allied families Betulaceæ (birches and alders) and Salicaceæ (willows and poplars) are rich in forms produced by parasites of widely different groups. These families are generally regarded as being among the older, and in some respects less specialised, Dicotyledons.

Turning now to the more specialised types of Dicotyledons, we find that of some families almost every member is liable to bear galls, while in others only certain genera are attacked, or only a few species of different genera may be so. Among the Rosaceæ we meet with numerous galls, the work of very various makers. Some of these are of low organisation, while others in their complexity of structure and in their aspect recall the highly specialised forms of oak-galls. The Cruciferæ, Leguminosæ, Rubiaceæ (as represented by the Bedstraws and their allies), and Compositæ may be mentioned as families including many herbaceous plants that bear galls. Among the more highly organised woody Dicotyledons, the Limes, Maples, and Common Ash are rich in galls, though seldom of complex structure.

Few families of Dicotyledons, even in the British flora, except some of those represented by only one or by very few species, are absolutely free from galls; and, if we look to the records from other countries, we see that a good many of our plants bear galls elsewhere, though they are not yet known to do so in the British Islands. Among the few that are not yet recorded as gall-bearers may be noted the families of the Water-lilies, Holly, Crowberry, Sundews, Water Milfoils, Ivy, Thrift, Bladderworts, and Bog Myrtle, along with a few other less conspicuous types. Several of these are water-plants, and others show peculiarities of nutrition that may protect them against the gall-makers. But it is difficult to suggest a sufficient cause why most of these families should be free, while others, apparently as secure against attack, are gall-bearers. The immunity of so many of the Monocotyledons is even more difficult to explain, *e.g.* the freedom from galls of Orchids and of Cyperaceæ (apart from a few Carices) in contrast with the relatively numerous galls on Grasses.

Every part of plants, from the rootlets upwards, is liable to be galled; but in each plant certain parts are usually more liable than others. Most gall-makers show a preference for a definite part; for example, some attack the roots alone, others the leaves, others the flowers, or even a single organ of the flower, such as the seed-vessel. A few parasites produce changes that show themselves

in most parts of the entire plant, which may be greatly altered. Indeed, so great is the change in some cases that the affected plants have been taken for species distinct from the type. Such conditions, which scarcely fall under the usual idea of galls, are generally the work of fungi. Widely extended effects are also produced by some of the gall-mites when they give rise to the condition known as virescence, the inflorescences being replaced by small ill-formed green bodies, and the foliage leaves being diminished in size, and usually more or less cut into narrow divisions or fringes. But in most cases the part attacked is strictly limited, though some species gall one organ at one period, and a different one at another, *e.g.* the leaf and root-galls of *Phylloxera vastatrix* on the Vine. The two forms of galls formed by the dimorphic generations of some gall insects have been already referred to. These, in their highest development, are confined in Britain to Oaks.

A gall-maker does not often affect plants of more than one natural order, except those that show a well-marked alternation of hosts, as do a good many fungi and some Aphides. These insects alternate between Dicotyledonous trees or shrubs, less often herbs, and grasses, on which they pass the winter. There is evidence that tends to show that some of the gall-mites also can live on, and distort plants of, different orders.

The various forms of galls have been ranged, as regards their structure, under two groups—(1) *Simple*, in which one member alone is affected, and (2) *Compound*, or *Bud-galls*, in which the shoot and the members that it bears are more or less altered.

The *Simple* galls have been divided into the subjoined groups:—

A. Felt-galls, better called *Hair-galls*, composed wholly, or at least chiefly, of hairs on the surface of the part affected.

B. Mantle-galls, formed by the part curving round, or by a pouch being formed by the increased growth of a limited area, resembling the finger of a glove projecting from the surface, or a pit formed by the more rapid growth of the sides of the cup. However formed, the hollow surface is lined with epiderm, corresponding to that of the outer sur-

face of the member forming or bearing the gall. The cavity serves to protect the maker of the gall. The Mantle-galls show three chief divisions corresponding to the modes in which they may be formed, as indicated above. They are :—

a. Roll-galls, formed by the margins of the part rolled upwards or downwards.

b. Pocket- or Pouch-galls, in which stimulus of a limited part of the galled member has caused increased growth of that part. Owing to the surrounding tissues not having increased in corresponding measure, the galled portion bulges outwards on one surface, and forms a pouch on the other side. The form and depth of this pouch depend on the extent of the part galled, and on the activity of growth within it. The Pouch-galls differ much in form. Often the pouches are wide and shallow, as on the leaves of many plants (*e.g.* the galls of *Cecidomyia pustulans* on Meadow-sweet, and those of Aphides, so common on Currant bushes in gardens). Sometimes they occupy most of the leaf, which is then usually curved round, as one sees so often in the leaves of Elms. On other leaves the pouch is a narrow ridge lying between two chief veins (*e.g.* in Hornbeam), or near the margin (in Honeysuckle). In this form the opening of the pouch is a long narrow slit, kept nearly closed by its edges. More striking forms are like a nail or bullet attached to the surface, usually of a leaf, by a narrow neck, through which is the exit. In these, the part affected has been very small, but growth in it has been very active, so as to disguise at first sight their true origin. Galls of these latter forms, the work of mites, are often abundant on leaves of Sloe, Birdcherry, Lime and Maple.

c. Covering-galls, or *Cup-galls*, as the third class of Mantle-galls may be termed, owe their form to the growth ceasing, or nearly so, at the point where the gall-maker or the egg is fixed, while it becomes very active around this point. A wall is thus built up, which forms at first a cup, but may elongate into a tube, or may arch over the cavity so as almost (seldom altogether) to shut it in. Sometimes the growth is much more rapid on one side, the position of the opening (as in the galls of *Tetraneura Ulmi* on Elm leaves) showing the true apex of the gall.

Hair-galls and *Mantle-galls* are not sharply marked off from one another, many forms combining the characters of both groups. They agree in the gall-makers living on the outer surface of the plants, not really penetrating the inner tissues.

C. The third class of Simple Galls differs from both the former in the gall-maker living *within the tissues* of the host, or *piercing the tissues and depositing an egg within them*, around which the gall grows. These galls differ widely in complexity, ranging from the blister-like galls of some mites (as on Pear and Mountain Ash leaves) or the irregular swellings caused by many fungi and nematoid worms, to the most highly developed galls known to us, those namely of the true Gall-flies or *Cynipidæ*. In the simpler forms the increase in size is almost wholly due to multiplication and enlargement of the cells, which are otherwise little altered in aspect. In them the parasites, if animals, live in irregular spaces between the loosely massed cells, or, if fungi, bore between and into the cells. In either case they draw their food from the contents of the cells. Galls of this class produced by mites almost always have the passage through which the animal penetrated to the interior kept open as an exit. In almost all others of the class the passage caused by the parasite when entering the tissues, or by the parent insect in depositing an egg within them, is soon blocked; and it can be recognised only with great difficulty, if at all. The latter are well distinguished as *Closed Galls*. Many of them remain closed throughout their existence, the parasites or their offspring being set free by the decay of the galls, as occurs with the "finger and toe" of turnips and other Crucifers, and the root-tubercles caused by some Nematoids. The more highly developed closed galls are formed mostly by Gall-flies and some Saw-flies for the protection and nourishment of the larvæ; some of them being formed around the egg, others only after the larvæ have emerged and begun to feed. The Gall-flies mostly undergo the full metamorphosis within the galls, the perfect insects escaping by holes eaten through the walls. The Saw-fly larvæ when full fed eat their way out, and, dropping to the earth, become pupæ, usually under ground. The galls of the

Cynipidæ very generally in the centre possess a thin-walled, small-celled food-mass rich in cell-contents as food for the larvæ. Around this is a somewhat sharply defined, more or less thick, protecting layer of tissue, composed of thick-walled pitted cells closely knitted together. Outside this protecting layer is in most cases a comparatively thick mass of thin-walled cells. In some galls this differs little from the ordinary ground-tissue of the part that bears the gall. In others it is, at least in part, composed of cells of very irregular outline that leave wide interspaces. The epiderm is as a rule not very different from that usually present on the plant. On some it bears characteristic hairs, as on the common Oak-spangles. The galls of other gall-makers seldom show any approach to such complexity of structure. In a simple closed gall there is usually only one chamber occupied by the larvæ; but in some there are more than one such well-defined space. Occasionally the food-mass surrounded by the protecting layer forms an inner gall, which separates away from the outer layers during growth, the latter increasing in size more rapidly than it. In a few cases, a part, like a cork in form, separates from the rest of the gall, and falls to the ground, carrying the larvæ with it. In some closed galls a small circular lid breaks away to form an exit. Where two different forms are produced by one insect (as by so many of the *Cynipidæ* on Oaks) these usually differ much in structure as well as in aspect. How great the difference may be, even when the two forms are produced on the same member of the plant, is well seen if one compares the soft, juicy, globular, smooth currant-gall of the Oak with the firm, rather dry, lens-shaped, hairy spangle, both forms growing from the leaves.

The *Compound Galls*, or *Bud-galls*, in their more marked forms appear very different from the simple forms, many members of the host being frequently involved in a single gall; but it is not possible to draw a clear line of separation between the two types. The compound galls are usually the result of attacks on buds in a very early stage of development, often before the members of the bud have become recognisable as separate parts. Frequently the gall is only an assemblage of parts of which each corresponds to

a simple gall, such as in the rolled leaves of *Geranium sanguineum*, or of the Bedstraws. But in most cases such a distortion of the parts is attended with shortening and other changes in the axis, altering very greatly the whole aspect of the shoot. Other bud-galls are buds that have remained abortive, or have swollen a little, the leaf-members becoming like widened leaf-scales. Others are more changed in aspect, forming large masses of tissue, in which it is difficult to recognise the ordinary parts of the plant. Some of the compound galls are the work of several gall-makers in co-operation ; others are produced by a single gall-maker for the protection and nourishment of several larvæ, each of which occupies its own chamber. Occasionally gall-makers that habitually form compound galls may also produce simple galls or *vice versa* ; and among the dimorphous gall-flies the one gall may be a compound, the other a simple, form.

Compound Galls may be divided into nearly the same groups as Simple. The *Hair-galls* and *Roll-galls*, however, are less numerous, and may in fact be regarded as mere assemblages of simple galls of these types, in which the growth of the branch itself is interfered with and its appearance changed. Compound Mantle-galls are often formed by the fusion of the edges of members usually free. Closed Bud-galls are formed by gall-makers of various groups, *e.g.* Gall-apples on Oaks.

Bud-galls differ in aspect according as they result from leaf-buds or from flower-buds. If a leaf-shoot is stunted, as the effect of the attack, the leaves are apt to be much increased in number and to be short and broad, overlapping at the edges. Thus a cone-like body is formed, as by a gall-midge on the Yew and by another on Bedstraw, if the leaves are closely placed one on the other ; or a rosette, as is often seen on Sallows and Hawthorn, if the short broad leaves spread apart. When the bases of the leaves become fleshy, and unite for a time, a body very like the fruit of some Conifer may result, as so commonly occurs on spruce twigs owing to the attack of the spruce Aphis.

Flower-bud galls resemble usually swollen buds that never open. Often they are conspicuously coloured. The

floral members are often much swollen and fleshy, and are fused together, the changes being greatest at the base. The stamens and carpels are almost always sterile. Often the parts of the flower are monstrously distorted (e.g. flowers of Crucifers galled by the white rust fungus *Cystopus candidus*). Gall-mites very often cause the parts to be multiplied and to become much cut, fringed, or otherwise distorted green bodies. The gall-makers live between the deformed parts, or within the tissues, just as in the simple galls. The bud-galls show very much the same diversities in structure and in surface as have been described already under simple galls.

Some compound galls reach a very considerable size, such as the "witch-besoms" so commonly caused by a fungus on Birches, and the large irregular masses, caused by a mite, that sometimes replace the inflorescence on the Ash.

Allusions have already been made in this paper to the groups of gall-makers, but a more systematic notice of them may not be out of place. Those that form galls on terrestrial plants in Britain belong chiefly to the groups Fungi, Nematoid Worms, Mites, and Insects. Of Insects the gall-makers in Britain belong to Hemiptera-Homoptera, Diptera, Coleoptera, Lepidoptera, and Hymenoptera. In the more recent works galls are termed *Cecidia*; and they are distinguished by a prefix to denote the group to which the maker belongs. There is a certain amount of convenience in this usage. To indicate its method, the different groups will be denoted by the appropriate names below.

MYCO-CECIDIA.—The galls formed by fungi belong mostly to the closed type, the threads of the fungus traversing the tissues of the host, and giving rise to a swelling or gall, which may be localised (as in the tumours on roots of *Juncus bufonius* caused by *Endorhiza*), or may alter the whole aspect of the plant (as by *Melanotænium* in Lady's Bedstraw). The reproductive bodies or spores of the fungus may be set free only by decay of the gall (as in these two fungi), or they may be formed on and dispersed from the surface of the gall (as in *Cystopus* and in the swellings of Juniper stems caused by *Gymnosporangium*). *Hair-galls* and *Mantle-galls* are caused by certain fungi (such as some

species of *Exoascus*) which confine their attacks to the epidermal cells and outer layers of ground-tissues. Some of the latter fungi also cause the conspicuous "birds' nests" referred to above. *Cup-galls* are formed, though of only small size, by some inconspicuous species of *Synchytrium* (e.g. on the Wood Anemone). The line of separation between simple and compound galls is very ill-defined in the case of the majority of Mycocecidia.

NEMATO-CECIDIA, or, preferably, HELMINTHO-CECIDIA, are the work of small nematoid worms. The great majority of animals of this low group live in water or damp soil or in decaying substances; but a few, belonging to the genera *Tylenchus* and *Heterodera*, form more or less well-defined galls on plants. The gall-making species *H. Schachtii* is a most formidable pest owing to the injury caused to many cultivated plants by its tuberous galls on their roots. It has been found over a great part of the earth's surface. The females become mere swollen egg-bags.

The species of *Tylenchus* are rather numerous, and their galls are produced on almost all members of plants upwards to the ovary. Their galls are swellings, often ill-defined, but usually confined in each species to one special member, e.g. on leaves of *Agrostis* and of *Plantago*, in ovary of wheat ("corn-cockles"), and so on. They are mere enlargements of the cellular tissues of the part, with no increased complexity of structure.

PHYTOPTO-CECIDIA are produced by a family of microscopic mites characterised by their small cephalo-thorax and long ringed abdomen, and by having only *four* small weak legs. They have been in recent years studied by Dr. A. Nalepa, who has published a series of very valuable papers on them, illustrated by most careful figures, and by Dr. Canestrini in his "Prospetto del Acarofauna italiana."

Dr. Nalepa has distinguished several genera and many species of these mites, and Dr. Canestrini has also described numerous species, while a few have been described by other workers. Careful investigations of the mites themselves has seldom revealed a species producing galls on plants of more than one natural order; but a reference is due to a paper by Dr. J. Peyritsch (in "Sitzungsber. d. Kais. Akad. der

Wissenschaften" of Vienna, xcvi. pp. 597-605), of which I prepared a translation for the "Scottish Naturalist," 1889, pp. 114-121. He describes in it the results of many experiments on infecting numerous plants of the orders *Valerianaceæ* and *Cruciferaæ*, and a few from other orders, by laying on them portions of *Valeriana tripteris*, found wild near Innsbruck, the buds of which were infested by *Phytoptus*. These results, he believed, prove that the same mites can gall in various ways many kinds of plants. Professor Dalla Torre of Innsbruck has also put on record an observation of Professor Heinricher, that willow twigs with buds galled by *Phytoptus* having been used as supports for *Polygala myrtifolia*, the latter after a time had its buds similarly galled.

Phytopto-ecidia chiefly belong to the types described above as *Hair-galls* (*Erineum*), *Roll-galls*, *Pouch-galls* (from the shallowest form of pouch to the slender nail form), *Blister-galls* (the mites boring into tissues of leaves or bark of twigs, but keeping the passage open), and *Bud-galls*. These forms pass into one another frequently. They may be restricted to limited portions of a member of the host, *e.g.* on the leaves; or they may affect almost every member on a shoot, passing into the bud-galls; or they may habitually affect the buds only, as in Black Currant and Hazel; or the buds may grow into short twigs with many lateral buds, causing small "witch-besoms." If the flower-buds are attacked they may become virescent, or may form large diseased masses, as in the Ash, or may be otherwise distorted. Mite-galls show little if any advance in complexity of structure beyond the normal tissues. Any change is rather in the nature of degeneration of tissues.

ENTOMO-CECIDIA is the name given to all galls formed by insects. But they are so numerous and so varied in structure that they are divided into the several groups to which the makers belong.

HEMIPTERO-CECIDIA.—The division Hemiptera includes a considerable number of gall-makers; but of those in Europe only one genus (*Lacomotopus*, galling the flowers of *Teucrium*) belongs to the Heteroptera or Plant-bugs. All the others belong to the Homoptera. The *Psyllidæ* are small leaf-hoppers, many of which produce pouches on

leaves, some being so shallow as scarcely to be noticeable, while a few are well-formed pouch-galls.

Of the *Aphidæ* (Green-flies or Plant-lice) a good many produce *Mantle-galls*, varying from shallow discoloured pouches or curled leaves, as on Currants, to very characteristic pouches or cup-galls of considerable size and depth, and often of peculiar form. Some produce bud-galls of cone-like form, as on the Spruce, or short shoots with broad loose leaf sheaths, between which the insects live. The notorious *Phylloxera* produces galls on leaves and on roots of the Vine; and the almost equally notorious American blight, or woolly blight, causes irregular outgrowths or cankers on branches of Apple-trees.

COLEOPTERO-CECIDIA, or the galls of beetles, are comparatively few. They mostly belong to the *closed* type of simple galls, and consist of an increase in the cellular tissue, with no clearly defined cavity or complexity of structure. They are found on roots and stems, as swellings of the cortex or of the pith, and are seldom very conspicuous. They do not often occur on leaves. The flowers are more often galled, especially the ovaries. The larger number of gall-making beetles belong to the family of Weevils (*Curculionidæ*).

DIPTERO-CECIDIA.—By far the greater number of the gall-making Diptera belong to the *Cecidomyidæ* or Gall-midges, a group numerous in species but very uniform in appearance. A very large number of genera have of late been put forward by specialists, based frequently on minute distinctions. Many of the *Cecidomyidæ* do not make galls, some feeding on minute fungi, others being carnivorous. From such forms we pass to the gall-makers by gradations from very shallow pouches on the leaf-surface to well-formed closed galls on various parts on the host. They seldom show a complex internal structure. The surface may vary from smooth to very hairy. We find among them, of the simple type, *Roll-galls*, *Pouch-galls*, *Cup-galls* (sometimes with a separable inner gall or lid), and *Closed-galls*, the latter at times being not very different in appearance from those of Hymenoptera. *Bud-galls* are very common, both of the leaf type and of the flower type. The larvæ live

between the parts of the buds, which may be considerably enlarged. Occasionally (*e.g.* on the Bedstraws) the bud-galls may be conjoined to form pretty large masses. The larvæ of some gall-midges pupate in the galls, while others leave the galls to pupate in the soil.

The *Trypetidæ*, a family of flies with spotted wings, and often not unlike the common house-flies in form and size, afford a small proportion of gall-makers, especially affecting *Compositæ*. On these plants the galls are formed either on the stem (*Urophora Cardui* on thistles), or in the flower-heads (*Trypeta solstitialis* or *Centaurea nigra*).

LEPIDOPTERO-CECIDIA are few, and of no special interest. They consist almost exclusively of thickenings of leaf-stalks, leaf-veins, or stems.

HYMENOPTERO-CECIDIA are numerous and varied, but all belong to the *closed* type, usually of simple galls, though bud-galls are not uncommon. The gall-makers in this division fall under the families *Tenthredinidæ* or Saw-flies, *Chalcididæ*, and *Cynipidæ* or true Gall-flies. All Hymenoptero-cecidia belong to the *closed* type, the mother, by means of the ovipositor, making a wound in the tissues, in which she deposits an egg. Afterwards the wound heals up. The Saw-flies make swellings in the twigs or leaf-stalks, or produce more conspicuous galls on leaf-blades, especially on *Salix*. These leaf-galls are pea-shaped and affixed by a narrow support; or they are bean-shaped and sunk, singly and in pairs, in the leaf, projecting on both surfaces. The galls are fleshy, and are composed chiefly of cellular tissues, the inner tissue forming a food-mass which is eaten away by the larva. There is no well-defined larval chamber; nor do the walls of the gall show clearly defined layers of tissue.

The *Chalcididæ* are mostly parasites on other insects, or dwellers in galls of true gall-makers, but the genus *Isosoma* causes thickenings on the stems of grasses, sometimes covered over with short broad leaf-sheaths, as on Couch-grass. The galls of the *Cynipidæ* have been so frequently referred to in the course of this paper as to make any lengthy reference to them here out of place. They show frequently the greatest degree of complexity in structure

known to us in galls. The Oaks bear a very large proportion of the galls of this family, many of the Oak-galls exhibiting very marked dimorphism, as demonstrated by Dr. Adler's researches. Roses bear several different forms of galls on leaves produced by the species of *Rhodites*; *Rubus* bears galls on stems caused by *Diastrophus*; and species of *Potentilla* have the creeping stems galled by *Xestophanes*. The genus *Aulax* includes a good many species, and is not so limited in its host plants. Most of the species cause more or less marked swellings in the inner tissues of stems of plants in widely different orders; thus *Aulax Hieracii*, Bouché, has been reared from galls on a number of species of *Hieracium*; and insects that Dr. Mayr could not distinguish from it have been reared from *Linaria vulgaris* and *Cytisus capitatus*; and Mr. Cameron is disposed to regard the maker of inconspicuous galls in knotty rhizomes of a grass (probably the False Oat-grass) as also this species, though named by himself at first *A. graminis*, because of the difference of food-plants. Other species of *Aulax* gall fruits, e.g. achenes of species of Scabious and capsules of Poppies.

Our information with regard to British gall-makers is more completely recorded for the Hymenoptera than for any other group, thanks to Mr. Cameron's work referred to above.

Most galls can be preserved in a state suitable for recognition by drying them. The large firm closed galls may be dried in an open place, where they are exposed to a free access of dry air but not to direct sunshine. Better results, if convenience permits, are obtained by keeping them in fine dry sand until the twigs and leaves around them are dry. The various Mantle-galls are best dried in sand, with which they should be filled as well as surrounded. This method gives them the support while drying that is required to prevent shrinkage and distortion. Hair-galls and virulent plants may be well preserved in the same way; but they may also be treated with fair success by the simpler method of drying in botanical paper, or between the leaves of a book.

Soft fleshy galls that contain much sap, such as Currant-galls of Oaks, galls of Weevils on Turnips, young galls of

Chermes on Spruce, and many bud-galls, especially in flower-buds, become much distorted if allowed to dry exposed to the air, and shrivel a good deal if dried in sand. Their form is well retained usually in one or other of the preservative fluids in common use, but they almost always lose much of their colour.

But while galls should be treated for permanent preservation in the way best fitted to give good results, they can be recognised in almost all cases from examples dried even roughly between the leaves of a book or between pieces of newspaper under only slight pressure. I will be glad to be favoured with the sight of specimens from any part of the country, however roughly dried, as actual specimens form the most trustworthy records.

Of course it is not possible to obtain the gall-makers usually from dried galls. To succeed in this it is necessary to have the fresh galls, and to keep them under conditions favourable to the development or study of the gall-maker. But, as already said, the galls are usually at least as easily recognised as their makers, and afford reliable evidence of distribution of the maker of the gall, if it has been already determined from elsewhere.

CAREX MAGELLANICA, L., IN THE OUTER HEBRIDES.

By ARTHUR BENNETT, F.L.S.

IN Dr. Shoolbred's paper on these islands, in the "Journal of Botany" for 1895, he reports the above species (the *C. irrigua* of Smith) from South Harris.

As Dr. Shoolbred notes that I had gone through the whole collection, it would be supposed that I agreed to the name; but I was surprised to see it so reported, having only noted *C. limosa* (specimen very poor) myself. I asked Dr. Shoolbred to kindly send me the specimen so named, and the authority for the name. This he did, and I fear he must

have thought me very neglectful not to have taken some notice of it ere this ; but I was not satisfied with the name, and asked Mr. Duncan to send me some specimens of *C. limosa* from North Harris which he told me he had gathered there. This he has lately done, and I was surprised at the variability of the plant. When one gets specimens sent from collections abroad, they naturally send what is supposed to best represent the species asked for, and so one gets good sets of typical species, but with no range of variation. Here is an evil not easily done away with, and which Hooker and Thomson in the "Flora of India" remark on as follows (I quote from memory): "It is much to be wished that botanists would collect the variations of species, and so see if many are not really extreme forms of some other species," etc.

After seeing these North Harris specimens and others from Arctic Europe, I have no hesitation in saying that Dr. Shoolbred's specimen is simply a form of *C. limosa*.

In looking over these North Harris examples I found that some much resembled the figure of *C. stygia*, Fries, in Andersson's "Cyperaceæ Scandinavicæ," t. 7, f. 71 (1849). Contrasting this with the figures of *limosa* (f. 73) and of *rariflora* (t. 6, f. 70), to which Fries considered *stygia* most nearly allied, it seemed that the Hebridean specimens much more resembled that of *stygia* than that of *limosa*. Fries insists, for one thing, on the "squamis . . . obtusis mucronatis obvolutis."¹ These Harris specimens varied from "obtusis" and "lanceolatis" to "evidentius apiculatis"² of Fries's *stygia*.

I have never been able to see an authentic specimen of Fries's *stygia* ; but Hjelt in his "Consp. Fl. Fennicæ," part iii. p. 293 (1895) (a Flora of great interest from the evidence of careful work that it contains), remarks: "An example in Fischer's herbarium is only *C. limosa*," quoting as authority "Treviranus in 'Moscow Bull.' No. 2, 542 (1863)." Also he says: "F. Nylander's example in Fries's herbarium from Hibinä belongs to *C. pulla*," quoting Th. Fries in "Iaktgelser rösande Östfinmarken Starr-Arter, 1857."

¹ "Summa Veg. Scand.," p. 234 (1846).

² Anderson, *l.c.* p. 35.

I have had occasion to note the likeness in habit, etc., of some *pulla* forms to *limosa*, and *vice versa*.

One of Mr. Duncan's specimens has the lower spike springing from the leaves of the rootstock, thus having a leaf forming the bract. I have seen this in *hirta*, *glauca*, *panicea*, etc., but not in the *limosa* series before.

Although I admit that it differs so much in look from the typical form, I do not see that it is possible to call Dr. Shoolbred's specimen a variety, as in the North Harris examples the glumes pass from his form, through all the forms given above, to exactly the glume figured under Fries's *stygia*.

Another critical Hebridean *Carex* found by Mr. Duncan was referred by me doubtfully to a *salina* form, "being very near *C. spiculosa*, Fries." I see that Dr. Hjelt¹ refers Fries's plant to "*C. salina* \times *vulgaris*, *juncella*." Dr. Almquist agreed that the plant was very near *spiculosa*, Fr.; and *vulgaris juncella* certainly occurs in the group, but no *salina* has yet been found, though Mr. Duncan has been over the ground again. *C. spiculosa* is very rare in Finland, being found only on the Kunookotka promontory in the White Sea. Though not absolutely identical with Fries's plant, ours is very near it.

Hjelt has a *C. aquatilis* \times *vulgaris*, *juncella*, which he says (t. Almquist, I presume) is *C. arcuata* of Laestadius: "Bidrag. Kän. i Tomeå Lappmark," p. 43 (1860). This I have not seen, but I do not see that one can say *juncella* positively enters into the Hebridean plant. Laestadius compares his plant with *aquatilis* and *acuta*, and says that it grew with *Betula nana*, *Vaccinium uliginosum*, *Tofieldia borealis*, *Pinguicula villosa*, etc.

¹ Or rather D. S. Almquist.

ZOOLOGICAL NOTES.

The Hedgehog in Sutherland.—In “A Vertebrate Fauna of the Moray Basin” (vol. i. p. 155), I find stated: “The Hedgehog is not yet found in a wild state in Sutherland, although it has been introduced on several occasions.” This year I found two Hedgehogs (*Erinaceus europæus*): one on the 21st July amongst long heather, and the other in thick brackens on the 3rd August. They were found about two miles up the Lettie, which is a tributary of the Fleet, and their haunts were only about 800 yards apart; and but for the movements of the dogs I should not have discovered them. As early as the beginning of autumn 1872 I found a Hedgehog about 200 yards from Tressady Lodge, but at the time did not consider it worthy of special notice.—WILLIAM MACKENZIE, Rogart, Sutherland.

Badger (*Meles taxus*, Schreb.) in Stirlingshire.—Mr. John Moir of Dunipace, Larbert, reports that a specimen of this mammal was found dead at the mouth of the conduit that enters from a ditch near Roughmute, Dunipace, during the last week of April. The body was taken to Mr. George Paterson of Thornton, who has had it stuffed, and who reports that it was three or four years old and that it measures 31 inches from tip to tip. Mr. Paterson also states that there was formerly an old “saugh” tree that stood exactly on the Thornton and Dunipace march, and at the foot of that tree there was a hole, known as the badger’s hole, and that led into the same drain or ditch where this one was found.

Long-eared and Pipistrelle Bats in Islay.—The presence of bats of different kinds in Islay has always been well known to the natives, though Mr. Harvie-Brown does not seem to have been able to obtain actual specimens from the island. In the spring of 1892 I saw one flying about, but could not identify the species. In August 1894 one was brought in alive, by a cat, to the kitchen of Mr. Colin Scott, Port Ellen. It proved to be the Pipistrelle (*Vesperugo pipistrellus*). Last November another—also a Pipistrelle—was sent me by Mr. M'Donald, lighthouse-keeper at Rhu Mhaoil, in the Sound of Islay, where it was caught alive. And only a week ago a third, a beautiful example of the Long-eared Bat (*Plecotus auritus*), was got in Port Ellen during the demolition of some old buildings. As the Gaelic names for these two species are different, the Long-eared Bat being called by a name signifying horned, we have a proof that both kinds have been sufficiently long recognised to have acquired distinctive names in Islay.—T. F. GILMOUR, Port Ellen.

Osprey (*Pandion haliaetus*) near Peterhead.—I have just been to see what was reported to me as a Golden Eagle captured in a pole trap at Ludquharn near Peterhead on the 17th May. It proved to be a healthy Osprey in fine plumage, seemingly a male of a year or two old: it measures 2 feet in length; expanse of wing 5 feet 2 inches. The bill is black, with the base horn-blue; the head has not much of a crest; forehead white, chin white, and the crown of the head brown—brown continuing over the nape. Upper plumage dark, but the tail is a shade lighter and banded: across the breast there is a very distinct broad band of brown, pretty like the plate in Morris's "British Birds," 1895 edition. All the rest of the under surface white, except that the long white feathers of the flank, under the wings, have six or seven large brown spots in them near the ends, and there are also six or seven smaller brown spots on the shorter flank feathers just under the shoulder. The bird is being looked after by the gamekeeper, who fed it on rabbits after it had shown no inclination to take fish.—WILLIAM SERLE, Peterhead.

Bittern at Invergarry.—A Bittern (*Botaurus stellaris*) was sent to Messrs. Macleay, Inverness, on 2nd February 1897, which was procured at Invergarry. They are very rare visitors so far north.—T. E. BUCKLEY, Inverness.

The White-fronted Goose in the Solway.—For the last few winters there has been a noticeable tendency amongst the wild Geese frequenting the Solway to increase in variety—that is to say, such species as the Brent (*Bernicla brenta*), Pink-footed (*Anser brachyrhynchus*), and Gray Lag (*Anser cinereus*) have put in an appearance in greater numbers than the odd birds of quite casual occurrence that have hitherto been seen. Some fairly large flocks of Pink-footed Geese have been observed, while on another occasion a string of about a score of Brents was noted. On the other hand, the Barnacles (*Brenta leucopsis*), which are the characteristic geese of the Solway, have hardly come up to their average numbers. On 23rd January I received a fine female specimen of the White-fronted Goose from Carsethorn. Of course the species is not rare in Britain, but has hitherto been of very considerable scarcity locally; by far the least frequent, I think, of the four species of "Gray" Geese in the Solway waters and merses. It was one of a party of four, all of whom would have been got, but the tide turned at the moment and prevented farther approach.—R. SERVICE, Maxwelltown.

Goosander and Scaup in Sutherlandshire.—I took a Goosander's nest this season from an island in a loch farther to the east than any other recorded locality in this country. The nest was in a hole in a peat bank, and contained eight eggs. The same day on which I

took the Goosander's nest I saw an adult pair of Scaups on the same loch, 17th May.—T. E. BUCKLEY, Rossal, Inverness.

Grebes in the Forth District.—The following birds have passed through my hands lately and may be worth recording :—(1) a female Great Crested Grebe (*Podiceps cristatus*) shot on 3rd February at Cramond by Mr. William Lumley, and presented by him to the Museum of Science and Art; (2) a female Eared Grebe (*Podiceps nigricollis*) and (3) a female Red-necked Grebe (*Podiceps griseigena*), both shot on 8th February by Mr. Robert Colledge at North Berwick.—WM. SMALL, Edinburgh.

House-Martin in Wigtownshire in March.—According to a correspondent of the "Glasgow Evening Times," a Swallow was observed near Whithorn at 6.30 P.M. on the 22nd of March this year, and was endeavouring to enter a dwelling-house by one of the windows. On the following day the bird was found dead in one of the apartments, the window of which is kept slightly open. It was forwarded with the correspondent's letter, and was sent by the proprietors of the paper to a Mr. Innes in my neighbourhood, in whose possession I saw the skin a few days later. The bird was a House-Martin (*Chelidon urbica*) with no appearance whatever of having been in confinement. It may be stated that at Burrow Head, a few miles from Whithorn, there is an enormous colony of House-Martins on the cliffs.—JOHN PATERSON, Glasgow.

Goldfinch in Midlothian.—It may be interesting to note that, while walking near Dregghorn, Midlothian, on 18th April, with P. Adair, Esq., we observed a pair of Goldfinches.—BRUCE CAMPBELL, Edinburgh.

Nesting of the Grasshopper Warbler (*Locustella naevia*) in "Upper Forth."—Although the Grasshopper Warbler is not at all an uncommon summer visitor to the "Forth" area, its nest seems seldom to have been discovered. At any rate I have myself frequently looked for it, but always, till this year, without success. In the beginning of May 1896 I heard the peculiar "reeling" sound which constitutes the song of this species in a swamp near Aberfoyle, but on returning a fortnight later I failed to hear or see anything more of the birds. This year I revisited the spot in the middle of May, and again the evidence was entirely negative. However, in two or three places, from one to two miles off, the "reeling" was nightly to be heard, and in one or other I hoped to find the nest later on. On 1st June I returned, but the search that day produced nothing. The following day (2nd June 1897), towards evening, my son and I walked out to the old locality at the swamp, little expecting, however, in view of previous experiences, to find the prize there. First a Reed Bunting and then a Sedge Warbler fluttered from their nests, and a

minute or two later a small brown bird slipped out of a clump of bog-myrtle almost at my son's feet. A few seconds sufficed to find the nest—a genuine Grasshopper Warbler's, neatly made of withered grass, and containing five closely freckled pinkish eggs, in which incubation had scarcely, if at all, begun. Though placed well down in a patch of rushes and bog-myrtle, the nest was nothing like so well concealed as I had expected; indeed, when looked at from above, the eggs were quite visible. On our going back next day to get a better look at the bird, we found her again on the nest and saw her quit it as before—a short flight of a couple of yards or so, then a rapid mouse-like movement among the grass for about the same distance, and she was gone. Presently a distinct, but not loud, *tick, tick, tick* indicated that she had made her way to some bushes thirty to forty yards off, and was there watching our proceedings. The only previous *record* of a nest of this species in "Forth" with which I am acquainted is that in MacGillivray's "British Birds" (vol. ii. p. 403) of one found by Durham Weir on the Bathgate Hills in the beginning of June 1835. But no doubt others have been found, though not recorded.—WILLIAM EVANS, Edinburgh.

The Little Gull (*Larus minutus*) in East Lothian in May.—On the 11th of May last (1897) a Little Gull—an adult female nearly in full summer plumage—was found lying dead in a field a mile south of Ballincreeff, East Lothian, and handed to Mr. James Lamb, Aberlady, who kindly sent it on to me. It bore no outward mark of injury, was in fair condition, and in beautiful plumage. The whole of the feathers of the under parts were suffused with a rosy tint of the most delicate description, and in a few days the black hood would no doubt have been fully acquired. As it is there are still a good many white winter feathers about the forehead and throat; these, unlike the newly acquired black ones, are all worn at the tips, and beneath them tiny black feathers just bursting through their sheaths can readily be seen. In this instance the change seems clearly to be one by moult, and not rejuvenescence and recoloration of the old feathers.—WILLIAM EVANS, Edinburgh.

The Fulmar on the Solway.—Although the Fulmar (*Fulmarus glacialis*) is sometimes said to be in the aggregate one of the most numerous birds in the world, it is uncommon enough in the Solway Firth. I am not aware that it has been got here on more than two, or perhaps three, previous occasions. In December a storm-driven example was found on Mersehead bank. It was in a sadly emaciated condition. This fine bird is, however, fairly often observed out at sea, betwixt the Mull and the Isle of Man.—R. SERVICE, Maxwelltown.

Abundance of the Cockchafer in the Solway District.—Are we going to have an outbreak of this troublesome and most

destructive insect? Its ravages have of late years been worse than usual in France and other parts of the Continent, and in Southern England it has also done damage. Specimens of the Cockchafer (*Melolontha vulgaris*) were sent to me in September, November, and in December—most unusual dates for it, as the ordinary time of flight is May and June. And early last month a Kirkbean farmer brought me a two-year-old example of the larva or grub, wishing to know what the creature was. In his case a “ley” field was literally overrun with these grubs. I have also heard of it from various other quarters, but not to such a serious extent as in the Kirkbean case. Like so many other noxious insects, the Cockchafer has what may be characterised as maximum and minimum periods at which its numbers increase or diminish. The causes for these periods of destructive increase, or the reverse, are no doubt climatic, depending upon the particular cycles of weather that may suit particular species, but very few precise observations have ever been applied towards their elucidation.—R. SERVICE, Maxwelltown.

***Libellula quadrimaculata*, L., in Ross-shire.**—On the 25th May last a fine specimen of this somewhat local Dragon-fly was sent to the Museum for identification by Mr. J. M'Lennan of Melvaig Schoolhouse, Gairloch, who stated that it had been captured there the day before. The occurrence of this species so far north may be of some interest to students of Neuroptera. The specimen has been kindly presented by Mr. M'Lennan to the Museum collections.—PERCY H. GRIMSHAW, Museum of Science and Art, Edinburgh.

***Erichthonius Hunteri* (Spence Bate) in the Cromarty Firth.**—This Amphipod was obtained in a miscellaneous gathering of invertebrates which I recently examined, and which was collected in the Cromarty Firth on 13th August 1895. Though *Erichthonius Hunteri* was described as far back as 1862 (see “British Museum Catalogue of Amphipoda” of that date), yet the first distinct British record of the species that I know of is that contained in part iii. of the “Fourteenth Annual Report of the Fishery Board for Scotland,” published last year. The specimens referred to in that Report were obtained in the Firth of Forth; its occurrence in the Cromarty Firth is therefore of interest—this being a new station for the species on the east coast of Scotland.—T. SCOTT, Leith.

***Scottomyzon gibberum* (T. and A. Scott) in the Cromarty Firth.**—*Scottomyzon gibberum* was described and figured by my son and I in the “Annals and Magazine of Natural History” for February 1894, from one or two specimens obtained in the Firth of Forth. Though at that time the species appeared to be rare, I have found since that it is really not uncommon in the Firth of Forth when one knows where to look for it. Some time after the discovery of the species in the Firth of Forth, my son obtained it in the Liverpool

Bay district, and I myself observed it in the estuary of the Clyde; but though it thus appears to be widely distributed it is only now that I am able to report its occurrence in the Cromarty Firth. Several specimens of this Copepod were obtained in the same gathering with the *Erichthonius* also now reported for that estuary. When describing this species in the "Annals and Magazine of Natural History," my son and I referred it to the genus *Dermatomyzon*, Claus, but at the same time pointed out certain structural differences between it and that genus. Dr. W. Giesbrecht of Naples, in his revision of the *Ascomyzontidæ* (published a few months ago), found it necessary to remove our Copepod to a new genus, and for it adopted the name given above, which is a modified form of the older name.—T. SCOTT, Leith.

Sabelliphillus Sarsi, Claparede, in the Clyde.—This Copepod, which is remarkable for its curious habit of living on the beautiful feathery plumes that adorn the head of a species of *Sabella*,—one of the marine Annelids,—has not yet, so far as I know, been recorded from the Scottish seas, and I have now the privilege of adding this interesting species to the Copepod fauna of Scotland. The specimens I have to record were observed on the plumes of two examples of *Sabella* captured in Kilbrennan, and on one taken about six to seven miles east of Sanda Island, near the mouth of the Clyde estuary. *Sabelliphillus* has been known for several years as a member of the marine fauna of Liverpool Bay, and is recorded for that district by Mr. I. C. Thompson, F.L.S. These Copepods are not easily noticed on the plumes of the *Sabella*, as the two are nearly of the same colour; they also adhere so firmly to the plumes as not to be readily shaken off even though the plumes are washed in strong spirit, and it is perhaps owing to this that *Sabelliphillus* has not been more frequently obtained.—T. SCOTT, Leith.

Cytherella serrulata, Brady and Norman, from the mouth of the Clyde.—Quite recently I obtained two specimens of this Ostracod in some muddy sand brought up from a depth of about sixty fathoms a few miles south of the island of Sanda at the mouth of the Clyde. Professor G. S. Brady, F.R.S., who kindly examined the specimens, thinks that they certainly belong to the species to which they are ascribed. So far as I know, *Cytherella serrulata* has not previously been recorded from the British seas; its occurrence at the mouth of the Clyde estuary is therefore of interest, as, besides being a new record, the distribution of the species is thereby considerably extended.—T. SCOTT, Leith.

BOTANICAL NOTES AND NEWS.

Hazel-nuts in Alluvial Soil near St. Andrews, and Note on Brambles.—In the parish of Cameron, near St. Andrews, Fife, comprising upwards of 9000 acres, there is not a single wild hazel bush, neither has there been within the memory of man; and yet, while constructing some four-feet-deep drains in alluvial soil, the workmen cast up hazel-nuts in shovelfuls, thus proving that a dense hazel copse must at one time have existed in the locality. The watershed of the now gently-running streamlet which must have washed down these hazel-nuts does not much exceed 3000 acres, and to deposit several feet of diluvium over several acres must have taken ages. How such a hardy plant as the common hazel should have entirely disappeared from the district is difficult to account for, as where the ground is not regularly cropped, broom, whin, and blackthorn apparently spring up spontaneously. I may mention that the shells of the hazel-nuts were entire, conclusively proving that squirrels did not abound there in those days.

I may also mention that till after 1853 there were only two or three stunted bramble bushes on the sides of the road between this and St. Andrews, a distance of four miles. In that year the road was improved by cutting and banking, and immediately brambles sprung up in the cuttings, and now abound; and very welcome they are, with their beautiful spring flowers, their fruit, and richly tinted autumn leaves. Curious to say, brambles have always abounded to the east of the road in question, but to the westward you may travel for at least half a dozen miles without seeing the vestige of one. Brambles, every one knows who has tried it, are difficult to extirpate; and yet nature has apparently capriciously done so, as above related. Of course the explanation of their resurrection in the cuttings (though, somewhat singular to say, not in the embankments) is that the seed had lain dormant till exposed to light and air; but brambles must have previously existed there, in order to produce the seed. Can any of your readers suggest an explanation of the above phenomena.—JOHN PURVIS, Kinaldy, Stravithy, R.S.O., Fife.

Juncus tenuis, Willd., in Westernness ("Annals," p. 32).—Mr. Arthur Bennett's suggestion that American hay has been the means

of introduction of this plant into Britain seems strengthened by some facts in relation to this case. After reading Mr. Bennett's article, I wrote to Mr. W. Grant, Arisaig, the finder of the plant, asking for any particulars he could think of. In reply he wrote: "The first place I found *Juncus tenuis* was on the edge of a hay-field, beside a track used for the cartage of manure, and not a quarter of a mile from the houses. I only found an odd plant or two there. Afterwards I found it thriving, but not very abundant, as a weed in a corner of the garden amongst rhubarb, etc., where the ground has not been dug for some years. I have not come across it anywhere else as yet, and it has evidently been introduced to these localities lately. There has certainly been a quantity of bought hay used in the stables during the last ten years, but where grown I do not know." The plant being as yet limited, so far as is known, to the two localities,—the side of a manure track, and among rhubarb, which is commonly mulched with manure,—combined with the fact that American hay is frequently bought in that part of the coast, as I know to be the case, makes the probability fairly strong that it has been introduced into this locality by this means.—SYMERS M. MACVICAR.

***Ceratiomyxa mucida*, Schr., and *Rivularia calcarea*, Smith, near Edinburgh.**—These plants were gathered near Balerno, on Saturday, 19th June, by members of the Edinburgh Field Naturalists' and Microscopical Society, during an entomological excursion under the leadership of Mr. P. H. Grimshaw. The fungus, found on a decayed pine stem, is not uncommon about Edinburgh, although Greville in his "Flora Edinensis" states it is rare, and only grows in the autumn. The alga, gathered on moist rocks, is rather rare in the neighbourhood.—A. B. STEELE, Edinburgh.

CURRENT LITERATURE.

The Titles and Purport of Papers and Notes relating to Scottish Natural History which have appeared during the Quarter—April-June 1897.

[The Editors desire assistance to enable them to make this Section as complete as possible. Contributions on the lines indicated will be most acceptable and will bear the initials of the Contributor. The Editors will have access to the sources of information undermentioned.]

ZOOLOGY.

BIRD-LIFE AROUND WALLS, SHETLAND. By Robert Godfrey, *The Field*, 1st May 1897, p. 677.

YELLOW WAGTAIL IN ARGYLLSHIRE. Robert Robinson Davison. *Zoologist* (4), vol. i. p. 167 (April 1897).—Records the occurrence last spring (March and April 1896) of a solitary specimen about a mile from Oban.

CAPTURES IN ORKNEY IN 1896. E. M. Cheesman. *Ent. Record*, vol. ix. p. 93 (15th April 1897).—A list of 55 species of Lepidoptera captured during the year.

TEPHROSIA BISTORTATA (CREPUSCULARIA) IN MORAYSHIRE. A. Horne. *Ent. Record*, vol. ix. p. 93 (15th April 1897).—A single specimen found, on 16th April 1892, resting on the trunk of a fir tree in the Altyre Wood, near Forbes.

VELIA CURRENS, FAB., IN SCOTLAND. R. M. Leake. *Entomologist*, vol. xxx. p. 176 (June 1897).—Three examples of the macropterous form taken at Musselburgh from the river Esk during the month of August 1893.

BOTANY.

NOTES ON BRITISH PLANTS—II. CAREX. By Arthur Bennett, F.L.S. *Journ. Bot.*, June 1897, pp. 244-252.—The following are Scottish records:—*Carex rupestris*, All., "more plentiful in W. Sutherland than the first record would seem to intimate"; *C. leporina*, L., var. *capitata*, Sond., "Mr. Miller gathered this in W. Sutherland in 1881"; *C. spiralis*, Ewing, from near the ridge between Forfar and Aberdeenshire (this is one of the *rigidæ*?); *C. aquatilis*, Wahl. Dr. Buchanan White sent a form from Whitemyre of Methven, referred by Dr. Almquist to *C. aquatilis*, var. *epigejos*, Laest., but

referred by Mr. Bennett to probably *C. aquatilis* \times *Goodenowii juncella* ; the forms of *aquatilis* found in Britain are enumerated ; \times *C. grantii*, Ar. Benn. = *C. aquatilis* \times *kattegattensis*, Fr., growing with parent forms by Wick river ; *C. salina*, Wahl., var. *kattegattensis* (Fries), by Beaully Firth ; *C. spiculosa*, Fries, forma *nova hebridense*, Ar. Benn., gathered in Harris, Outer Hebrides, by Mr. Duncan.

NOTES ON SOME RARE SPECIES OF MYCETOZOA. By Arthur Lister, F.L.S. *Journ. Bot.*, June 1897, pp. 209-218.—Includes notices of numerous species—among them one new species and several new varieties. The following records are from Scotland :—*Physarum penetrale*, Rex, at Moffat, on a pine-stick ; *Trichia Botrytis*, var. *munda*, n. var., at Moffat ; both collected about 1879 by Professor Balfour.

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THE BIRDS OF CARMICHAEL PARISH, WITH NOTES ON RARER SPECIES IN THE UPPER WARD OF LANARKSHIRE.

By Rev. JAMES D. W. GIBSON, B.D.

THE Parish of Carmichael¹ may be roughly outlined as the tract of country bounded on the N.W. by the Clyde and Douglas Water, which each after a course of about three miles along the north-west border—the former in a south-westerly, the latter in a north-easterly direction—meet to flow towards the N.W.; on the S.W., S., and S.E., by the range of Tinto, circling round as a natural background; and on the N.E. by the Carlisle Road. “The surface of the parish presents a very unequal and diversified aspect, the mountain range of Tinto looking down from a commanding elevation” (cairn on top is 2335 feet above the sea-level) “upon several hills and valleys which lie at its base, and sending many tributary streams” (Cleuch, Carmichael, Drumalbin, and Ponfeigh Burns) “to the Clyde and Douglas Water.” Between Tinto and the Clyde and Douglas Water two distinct ranges of hills may be traced running parallel with these rivers, but the continuity of each range is broken by

¹ The Parish of Carmichael is contained on the Ordnance Survey Map No. 23.

the valleys which follow the courses of the streams, so that a feature of the scenery is the number of hills—for the most part grassy—cut off from one another and attaining to altitudes varying from 1220 ft. (Woodlands or Black Hill) to 1156 ft. (Carmichael Hill), to 1014 ft. (Crossridge), and 884 ft. (Whitecastle). The district, although upland, the lowest elevation being over 600 ft., is fertile where arable, and in favourable seasons good crops of hay and oats are reaped. But, as can be understood, seeing it is so far inland as well as upland, spring is late and autumn quickly passes into the severity of winter, and this remark applies to the whole of the Upper Ward.

On the east of the Carmichael Burn the hillsides and valleys are well sprinkled with fine old beeches—in rows and clumps—not less than 150 years old. These afford fine situations for several rookeries. Within and adjoining Carmichael Policies are many thriving young plantations of spruce and fir interspersed with hardwood, of ages varying from two to twenty-five years' planting. On the Eastend Estate at the base of Tinto stretch long plantations of old larch and Scotch fir—sadly decimated by the winter storms of 1883-84. On the Douglas Estate the hill above the Manse is well wooded with fir and spruce on its N.E. and S.E. slopes, and the heathery sides of Stonehill are covered on the N.W. with an old plantation of fir and hardwood, part of which was also levelled by these storms, but has been renewed a few years ago.

The following list is the result of observation, more or less continuous, during a residence in the parish of over twelve years. It is not published with any pretensions to completeness or finality, but as a contribution towards an Avifauna of Upper Clydesdale. It may not be inappropriate in this connection to quote the following from White's classic "Selborne":—"It is now more than forty years that I paid some attention to the ornithology of this district; without being able to exhaust the subject, new occurrences still arise as long as inquiries are kept alive." In the preparation of the list I have had the benefit of the help of others; to one and all of those named in the text I offer my sincere thanks. To my much esteemed friend Sir W. Carmichael Anstruther,

Bart., as also to Mrs. Thomson Carmichael, my thanks are due for permission to refer to specimens of rarer species preserved in Carmichael and Eastend Houses. In the list I have incorporated notices in "New Statistical Account" (1841) [hereinafter referred to as "S. A."], as also all notes on distribution in the Upper Ward in R. Gray's "Birds of the West of Scotland," etc. [hereinafter referred to as "B.W.S."], as these were furnished by the late Edward R. Alston, Esq., who resided at Stockbriggs, in Lesmahagow Parish. John Paterson, Esq., Glasgow, has favoured me with the perusal of "Notes on Birds in Douglasdale, etc., 23rd May 1895, and 1st, 2nd, and 3rd June 1895" [hereinafter referred to as "Notes"]; Mr. Drummond Pringle, Chapel, Braidwood, has gone over with me his interesting collection; to them, as well as to J. A. Harvie-Brown, Esq., F.R.S.E., etc., for many valuable suggestions in the preparation of this list, I am under deep obligation.

MISSLE THRUSH, *Turdus viscivorus*, L., local name "Feltifare."—

Fairly common, but not seen in numbers till autumn, when flocks assemble to feed on berries of rowan tree, etc. Absent during severe weather in winter, but may be heard in song as early as January 4 (1897). A light cream-coloured specimen frequented the parish for three seasons, from April 12, 1892 to 1894.

SONG THRUSH, *Turdus musicus*, L., local name "Mavis."—Abundant. Absent in winter, returning as early as the beginning of February (February 15, 1897. On this date, at the break-up of frost and snowstorm there appeared also Lapwings and Golden Plovers and Larks.)

REDWING, *Turdus iliacus*, L.—Very rare. I have not myself observed it. Mr. D. Pringle used to see it in numbers—not, however, of late—in his district.

FIELDFARE, *Turdus pilaris*, L.—Present on migration in small flocks during autumn, winter, and spring, as late as April 13, 1897. When seen in autumn and winter they are wild and restless, generally passing over the fields foraging, heading towards the S.W. Straggling parties of three or four may remain for a few days during severe frost. In "S. A." it is stated that "a pair of Fieldfares have twice remained the whole year, and built their nest near the Manse" of Crawfordjohn, about 1836. (Mr. Harvie-Brown remarks: "These are probably only Missle Thrushes, which in Scotland are popularly known as "Feltifiers" or "Felties.")

BLACKBIRD, *Turdus merula*, L., local name "Blackie."—Resident and breeding. Very common.

RING OUZEL, *Turdus torquatus*, L.—A few, as in 1871 ("B. W. S.") Have heard it in song in glen above Lochlyock, May 11, 1896. The young occasionally in small parties visit gardens in autumn. Mr. Paterson found it nesting on the Windrow Burn and on another tributary of Douglas Water ("Notes").

WHEATEAR, *Saxicola œnanthe*, L.—Common, arriving in March, sometimes as late as April 5 (1897). This season a bird was seen coming out of a bank of loose stones within 200 feet of top of Tinto, and by its movements indicated that it was nesting.

WHINCHAT, *Pratincola rubetra* (L.), local name "Whinchucker."—Rather common. Mr. Paterson found it very common all over the district traversed by him, in striking contrast to the Wheatear ("Notes").

STONECHAT, *Pratincola rubicola* (L.), local name "Stanechucker."—Very rare. Only once observed it. Mr. Alex. Telfer, head gamekeeper, Douglas, reports its presence in Douglasdale. Mr. D. Pringle has seen it two or three times in winter near his place.

REDSTART, *Ruticilla phœnicurus* (L.)—Noted as scarce in Biggar district in 1835 ("S. A."). Gray ("B. W. S.") writes (in 1871) that thirty years ago (*i.e.* 1841) this species would appear to have been much commoner in Lanarkshire than it is now. At present it is well distributed in the district and by no means uncommon. Within the last ten years there has been a decidedly appreciable increase. Mr. D. Pringle reports a like increase for his district. First seen this season April 26 at Braidwood, and May 18 in the parish. Mr. Paterson saw it in Happendon Woods and in Braidlea Burn glen, Douglas ("Notes").

REDBREAST, *Erithacus rubecula* (L.), local name "Robin."—Common and resident, nesting near the Manse.

WHITETHROAT, *Sylvia cinerea*, Bechst.—Regular visitor. Scarcer this season. Mr. Paterson found it common in suitable localities ("Notes").

LESSER WHITETHROAT, *Sylvia curruca*, (L.)—Very rare. A pair frequented the hedgerows of the Glebe for a short time during the early summer of 1896.

BLACKCAP, *Sylvia atricapilla* (L.)—Mr. D. Pringle reports the presence of this species in his district, and has specimens in his collection.

GARDEN WARBLER *Sylvia hortensis* (Bechst.)—One seen in Manse garden, May 22, 1897; another afterwards, on June 20, in hedgerow below Crossridge Farm, gathering insects, which it carried off in the direction of Carmichael Policies. For an interesting note on the distribution of this species around Lanark, see paragraph by Mr. John Paterson in "Annals of Scottish Natural History," 1895, p. 194. Mr. D. Pringle reports it as nesting at Chapel.

GOLDEN-CRESTED WREN, *Regulus cristatus* K. L. Koch.—Reported as common around Biggar in 1835 ("S. A."); and under Walston is the remark that at times it may be met with, the Rev. J. Wilson having found one perched on the bell-rope in his study, October 1835. Seen by Mr. J. Paterson in Happendon Woods, Douglas. It is known to Mr. A. Telfer. There are several families frequenting suitable localities in the parish: Carmichael Avenue, Stonehill, and Eastend Woods.

WILLOW WREN, *Phylloscopus trochilus* (L.)—An abundant spring, summer, and autumn visitant. Appeared this season April 15 at Braidwood, and April 30 in the parish.

WOOD WREN, *Phylloscopus sibilatrix* (Bechst.)—Mr. J. Paterson found this species scarce in Braidlea Burn glen, but frequent and common in Happendon Woods ("Notes"). I have heard the note of this species among the pines of Carmichael Avenue and Stonehill Wood, but have not seen the bird itself. Mr. Paterson informs me (*in lit.* August 9, 1897) that he also knows of the presence of this species "on the Avon, the Fiddler's Burn, the Mouse, and Falls of Clyde."

SEDGE WARBLER, *Acrocephalus phragmitis* (Bechst.)—Not uncommon, and nesting. Mr. Paterson found it common in district visited by him ("Notes").

HEDGE SPARROW, *Accentor modularis* (L.), local name "Dykie."—Resident and common.

DIPPER, *Cinclus aquaticus*, Bechst., local name "Water-crow."—Resident along the Clyde and all the streams of the district. Referring to note in "Annals of Scottish Natural History," 1892, p. 198—"On Unusual Nesting-Places of Species"—the following particulars may be given. In 1889 a nest was found on the top of a boulder about three feet high in mid-stream of the Carmichael Burn. It appeared to be a piece of rough turf stranded after a spate. On being touched it fell over, and the bird flew out, revealing the nest. In 1891 a nest was built on the very point of an old hawthorn stump, about six feet above the burn at the foot of the Manse garden. The situation was too conspicuous, and it was destroyed after eggs

were laid. Gray records a touching incident referring to the song of a Dipper observed near Lanark ("B. W. S.")

From the Hyndford Bridge it may be watched resting like a miniature duck on the water to dive to the bed of the river, where it may be seen searching for food among the pebbles of the bottom. One very cold morning in the beginning of last April I was much pleased by being the witness of a male bird displaying the charms of his dress and voice to his mate. Sitting "bolt upright" and uttering loudly his song, he made the white feathers of his breast stand out straight and conspicuous, giving him the appearance as if a white napkin had been tied around his neck and was hanging down in front. This attitude he went through several times, following in short flights his seemingly irresponsive and inattentive spouse.

LONG-TAILED TITMOUSE, *Acredula caudata* (L.)—It is noted as scarce in Biggar Parish in 1835 ("S. A."). Mr. Robert Gray, game-keeper, Westraw, has known it nesting in Carmichael Policies. Mr. A. Telfer has kindly informed me that he has seen it several times in Douglasdale: once on a tree in front of his house at Braidlea. Seen frequently in Fiddler's Gill (Mr. D. Pringle).

GREAT TITMOUSE, *Parus major*, L., local name "Ox-ee."—Resident and generally distributed. Chiefly in evidence with the Blue Titmouse in winter.

COAL TITMOUSE, *Parus ater*, L.—Not so common in winter as preceding and following, but during summer and autumn it is the commonest of all the Tits.

MARSH TITMOUSE, *Parus palustris*, L.—Gray's remarks on this species ("B. W. S.") may be quoted: "Writing from the Upper Ward of Lanarkshire, Mr. Alston informs me that, though not so numerous as the preceding" (*i.e.* Coal Titmouse), "the Marsh Tit is not uncommon in his neighbourhood, and nests there regularly, frequenting natural birch woods and pine plantations." I have not observed it in the parish. Mr. D. Pringle reports its presence at Chapel, Braidwood, but tells me that it has not been so common within the last eighteen months.

BLUE TITMOUSE, *Parus cæruleus*, L.—Resident and common.

WREN, *Troglodytes parvulus*, K. L. Koch.—Resident; varying in numbers, being more common during some seasons than others.

TREE CREEPER, *Certhia familiaris*, L., local name "Woodpecker," "Tree-speeler."—Resident; rarer than the preceding. Mr. Paterson observed it in Braidlea Burn glen ("Notes").

PIED WAGTAIL, *Motacilla lugubris*, Temminck.—Common spring and summer visitor. The most common of all the Wagtails. Rarer than usual this season.

GRAY WAGTAIL, *Motacilla melanope*, Pallas.—Regular visitor in less numbers than the preceding; relative numbers of species seem to have changed since Alston's time ("B. W. S.")

[“YELLOW WAGTAIL, *Motacilla flava*” (“S. A.”); “BLUE WAGTAIL, *Motacilla cerulea*” (“S. A.”).—Noted in 1838 as birds of the parish. Are probably the Gray and Pied species respectively, neither of which is given in “S. A.”]

TREE PIPIT, *Anthus trivialis* (L.).—This species visits the parish and district regularly in fair numbers. Mr. Alston (“B. W. S.”) also records its presence, and Mr. Paterson found it common (“Notes”). Mr. D. Pringle reports it common in his district.

MEADOW PIPIT, *Anthus pratensis* (L.), local name “Mosscheeper.”—Abundant in spring, summer, and autumn all over the grass and heath lands of the district.

GREAT GRAY SHRIKE, *Lanius excubitor*, L.—Irregular visitor. Specimen shot near the Manse by Mr. R. Gray, then gamekeeper, Carmichael, preserved in Carmichael House. One was shot in Lanark Parish, April 11, 1896 (“Annals of Scottish Natural History,” 1896, p. 190); another in Carluke Parish about November 1896 (Mr. D. Pringle).

WAXWING, *Ampelis garrulus*, L.—Gray records (“B. W. S.”) the capture of five birds of this species near Lanark early in December 1866. One was got three or four years ago at Hazelbank on the Clyde, about three miles north of Lanark (Mr. D. Pringle).

SPOTTED FLYCATCHER, *Muscicapa grisola*, L.—Regular and common summer visitor. Nests every season on the ivied walls of the Manse offices. Alston once observed a nest on the ground at the root of a tree (“B. W. S.”) Arrived this season on May 19.

SWALLOW, *Hirundo rustica*, L.—Every farm “town” holds a nesting colony of this species.

MARTIN, *Chelidon urbica* (L.).—As abundant as the preceding, and nests under eaves of farmhouses and in haysheds. Mr. Paterson observed a colony on railway bridge over Mouse at Cleghorn (“Notes”).

SAND MARTIN, *Cotile riparia* (L.).—Common, and nesting wherever it finds suitable sites. It arrived this year April 18, a week before the swallow, April 23.

GREENFINCH, *Ligurinus chloris* (L.).—Resident. Very abundant in late autumn and winter.

GOLDFINCH, *Carduelis elegans*, Stephens, local name “Gouldie.”—Once common in the district, to judge from “S. A.” and from the statements of elderly persons as to numbers trapped by bird-

catchers. Mr. Jas. Wylie, gamekeeper, Carmichael, has kindly informed me that he saw a small flock of about a dozen in Carmichael Policies during cold weather at end of January last. An individual was seen near Castlemains, Douglas, in August this year (Mr. A. Telfer). Used to be fairly common at Chapel, Braidwood, but now very rare, and none seen for two or three years (Mr. D. Pringle).

SISKIN, *Chrysomitris spinus* (L.)—Gray remarks ("B. W. S.") : "Thirty years ago" (*i.e.* about 1841) "this was a well-known winter visitant in some parts of Lanarkshire, but from all I can learn it is much less common, or at least not so steady in its times of appearance." Have never seen it in the parish. Sometimes it is seen by Mr. D. Pringle.

HOUSE SPARROW, *Passer domesticus* (L.)—Very abundant. Individuals speckled with white are not uncommon. This season during month of July a specimen with almost black plumage frequented the neighbourhood of Hyndford Bridge.

TREE SPARROW, *Passer montanus* (L.)—During cold weather in January last this species appeared in the parish. I obtained one for identification on January 26 near the Manse, and some days afterwards noticed several in hedgerow near Cross-ridge.

CHAFFINCH, *Fringilla cœlebs*, L., local name "Shelfa."—Resident and abundant.

BRAMBLING, *Fringilla montifringilla*, L., local name "Cock of the North."—Winter visitant. Last season was markedly in evidence during January.

LINNET, *Acanthis cannabina* (L.), local name "Whin Lintie."—Is now very scarce in the parish, though referred to as being very common about thirty years ago. Noted as bird of parish in 1838 ("S. A.") under name of Brown Linnet.

LESSER REDPOLL, *Acanthis rufescens* (Vieillot).—"Common around Biggar" in 1835 ("S. A.") Gray ("B. W. S.") notes this bird as sparingly distributed in parts of Lanarkshire, excepting around Glasgow. Mr. A. Telfer knows the species around Douglas, and Mr. D. Pringle reports it as not very plentiful in his district. Not common in the parish, but young birds appear in small numbers towards autumn.

TWITE, *Acanthis flavirostris* (L.), local name "Heather Lintie."—Appears regularly in flocks in autumn, and feeds on the seed of ragweed. Towards end of December it is less in evidence, again appearing in March in immense flocks which may be heard uttering their twittering song in stormy weather from the shelter of a stone dyke. Gray ("B. W. S.") says it nests in the

higher grounds of Lanarkshire. Mr. Baxter, Woodlands, gives me the interesting information that it nests not infrequently in heather bushes on his hill.

BULLFINCH, *Pyrrhula europæa* (Vieillot).—Gray writes ("B. W. S.") : "Mr. Alston informs me that it appears to be on the increase in Lanarkshire." Not uncommon now, making its appearance in pairs with young, August 1895 ; or in small parties of nine, February 19, 1897 ; or in pairs, ♂ and ♀, July 3, 1897. It nested in the parish three seasons ago. It prefers the more sheltered and wooded grounds and orchards by the Clyde below Lanark. Noted as a bird of the parish in "S. A."

CROSSBILL, *Loxia curvirostra* (L.).—In "S. A.," under Carluke, is the following : "The Crossbill, after an absence of eleven years, has again paid us a visit in considerable numbers" (August 1838). Gray ("B. W. S.") remarks that this species "in many parts of Lanarkshire is found in considerable numbers during the breeding season, especially in the neighbourhood of Douglas." Specimens were obtained at Braidwood in 1853 (Mr. D. Pringle). Mr. Paterson remarks ("Notes") : "Mr. Amos" (for about forty years the much respected head gamekeeper on Douglas Estate) "tells me he has no knowledge of the occurrence of the species."

CORN BUNTING, *Emberiza miliaria*, L.—Very partially distributed in pairs, showing a marked preference for special spots ; three of which are known to me in the parish. Appears to be absent during very severe weather in winter.

YELLOW BUNTING, *Emberiza citrinella*, L., local name "Yellow Yite."—Resident and common.

REED BUNTING, *Emberiza schoeniclus*, L.—Resident, but less common than the preceding.

SNOW BUNTING, *Plectrophenax nivalis* (L.).—Winter visitor in variable numbers. Very abundant last winter up till the 21st March.

STARLING, *Sturnus vulgaris*, L.—This species has increased greatly within recent years, and is still increasing, nesting in every available place. Sometimes appears in immense flocks during spring migration—March 17 and 18, 1897. Up till within forty years ago it seems to have been rare. In "S. A.," under Wandell and Lamington, it is stated that a few have been occasionally seen and some captured for pets. In my notebook I find the following : "January 13" (a few days previous to severe snowstorm)—"After several dull, quiet days, to-day is very bright and fine. Observe the Rooks are paired. A Starling was looking out for a hole in ivied wall at front of Manse in which to commence nest-building."

CHOUGH, *Pyrhocorax graculus* (L.)—"In the winter of 1834 a *Corvus graculus* or Red-legged Crow appeared in the vicinity of the village" of Crawfordjohn "and was shot" ("S. A.")

MAGPIE, *Pica rustica* (Scopoli).—Is occasionally seen in pairs in spring, making ineffectual attempts to establish itself in the parish. It has nested—though unsuccessfully—in fir wood on hill west of Manse; and there is a nest—built a few seasons ago—still holding together on a low "saugh" tree in Harleyholm Meadow.

JACKDAW, *Corvus monedula*, L.—Abundant; specially so during winter. Among its nesting-haunts may be numbered some rabbit burrows on the very easy southern slope of Carmichael Hill.

RAVEN, *Corvus corax*, L.—Very rarely seen. In "S. A.," under Biggar, it is said that the Raven is occasionally seen passing to its "haunts on Tinto." Alas! these no longer claim it, though seventeen or eighteen years ago there was on Tinto a nest from which three young birds got away (Mr. R. Gray). Two were killed on Tinto ten years ago (Mr. T. Cranston); and Mr. Edward Stodart, head gamekeeper, Eastend, has kindly informed me that he has killed it on the Scaut Hill, Symington. Last season, Mr. A. Telfer observed it on the hills above Douglas, and one of a pair frequenting Carstairs Woods was trapped by Mr. R. Gray.

CARRION CROW, *Corvus corone*, L., local name "Corbie," "Hoodie."—Resident, and nests; three nests at least in parish last season. Numbers greatly increased during late autumn and winter, so that a flock of a dozen may at times be counted.

HOODED CROW, *Corvus cornix*, L., local name "Gray Hoodie."—Rare. Specimen killed by Mr. T. Cranston preserved in Carmichael House. Another was killed this year on Tinto (Mr. T. Cranston). It has also been killed on Scaut Hill, Symington (Mr. Ed. Stodart).

ROOK, *Corvus frugilegus*, L.—Resident and abundant, in spite of young being kept down owing to its egg-destroying propensities. Evidence that in this district it in instances retains feathers at the base of bill. Mr. T. Cranston informs me that for some years a part of rookery at Carmichael of about forty nests has been entirely taken up by individuals with feathered bills. This season there are few, as the birds were shot hard down last year, as he considered them more destructive on eggs, etc., than the "bare-billed" Rooks.

SKYLARK, *Alauda arvensis*, L.—Fairly abundant and widely dispersed from spring till autumn all over the district on heath and

pasture lands. Mr. Paterson found it common, and in the valley of the Duneaton, about Crawfordjohn, very many occur ("Notes").

SWIFT, *Cypselus apus* (L.)—Regular summer visitor. There is a colony of from thirty to forty pairs nesting under the iron bridge of the Caledonian Railway at Pretts Mill. A favourite haunt is around the cairn on Tinto.

NIGHTJAR, *Caprimulgus europæus*, L., local name "Burr Owl."—Mr. T. Cranston informs me that he shot a "Burr Owl" over twenty-five years ago at Fala, Carnwath. Rare, but may be heard occasionally in Stonehill Plantation, where one was shot a few years ago (Mr. J. Kerr, gamekeeper, Douglas). Mr. J. Wylie tells me one rose from the heather on Shawhill, June 11, 1897, where a fortnight afterwards he saw the remains of a dead one. Mr. A. Telfer saw an old one with a young one on August 9 of this year, and I saw one on evening of September 2 near the Schoolhouse.

KINGFISHER, *Alcedo ispida*, L.—An irregular visitor. One frequented the Carmichael Burn at foot of Manse garden at intervals during 1889-90. Has been seen by the Clyde, and by the stream below Carmichael House, and near Warrenhill (Messrs. T. Cranston and J. Wylie), and by the pond at Eastend (Mr. Ed. Stodart). About five years ago there was a nest—unfortunately destroyed—on the banks of Douglas Water below Harperfield (Mr. J. Kerr). Mr. A. Telfer has seen it this season within Douglas Policies.

ROLLER, *Coracias garrulus*, L.—Gray ("B. W. S.") notes that a bird of this species was shot at Culter House, Biggar, in October 1866.

CUCKOO, *Cuculus canorus*, L.—Seen and heard all over the district. First heard this season, April 26.

BARN OWL, *Strix flammea*, L.—Still frequents the district. Specimens are preserved in Eastend House. One was caught on Lochlyock in a rabbit trap at the mouth of a burrow, February 19, 1897.

LONG-EARED OWL, *Asio otus* L., local name "Horned Owl."—This species has, of all the Owls, come most frequently under my notice. Mr. A. Telfer finds it the most common around Douglas. Alston ("B. W. S.") states it is common in the Upper Ward.

SHORT-EARED OWL, *Asio accipitrinus* (Pallas), local name "Hill Owl."—Was very common on Thankerton Moor during the vole plague; since then less common (Mr. T. Cranston). It is not unfrequently seen on the moors around Douglas (Mr. A. Telfer).

TAWNY OWL, *Syrnium aluco* (L.).—Gray writes ("B. W. S.") : "Mr. Alston informs me that it is very common in Upper Ward of Lanarkshire." At present it appears to hold a middle place between the two preceding, and is not uncommon. [Mr. Paterson states ("Notes") that "Owls are less common, according to Mr. Amos, since the great destruction of timber in Douglasdale a decade ago" (1883-84).]

COMMON BUZZARD, *Buteo vulgaris*, Leach.—Specimen preserved in Mr. D. Pringle's collection, which was got at Eastend two years ago.

ROUGH-LEGGED BUZZARD, *Buteo lagopus* (J. F. Gmelin).—Specimen, got by Mr. E. Stodart, preserved in Eastend House; another in possession of Mr. R. Gray, who shot it on Shawhill. One was shot on Westsidewood Estate, Carnwath, March 15, 1896 ("Annals of Scottish Natural History," 1896, p. 191).

[**EAGLES**.—[In "S. A." it is said that "the Eagle is sometimes seen on the hills to the north of Dunsyre, particularly on Craigengar" (1834); and under Hamilton that "the Erne is often observed" (1835).] An Eagle flew between Douglas and Carmichael some years ago (Mr. T. Cranston). Mr. Paterson has the following note: "A Golden Eagle, Mr. Amos tells me, took up its quarters in an island on one of the lochs recently, where it created some havoc among the Ducks, which are rigorously protected."]

SPARROW HAWK, *Accipiter nisus* (L.), local name "Blue Hawk."—This species still holds its own, and may be seen dashing over the hedgerows or by the side of plantations after its prey. On March 20, 1897, a female struck the plate-glass window of Manse dining-room in an attempt to seize a canary.

KITE, *Milvus iclinus* (Savigny).—A specimen of this species is preserved in Eastend House, shot on the estate about ten years ago (*infor. in lit.* July 22, 1897, by Mrs. Thomson Carmichael).

PEREGRINE FALCON, *Falco peregrinus* (Tunstall).—This Falcon is occasionally seen. Two specimens, young and old females, got by Mr. Ed. Stodart, are preserved in Eastend House. Mr. A. Telfer informs me that an injured female has for some time roosted on one of the windows of Douglas Castle, and that he has seen this species occasionally on the moors. He possesses at present a fine tamed bird, ♀, now in its second year, taken from an eyrie on Meggat Water, Peeblesshire.

MERLIN, *Falco æsalon* (Tunstall).—This species still nests in the parish and district, but is not so common as the Sparrow Hawk or Kestrel.

KESTREL, *Falco tinnunculus* (L.), local name "Red Hawk."—Commonest of all the hawks, specially in autumn, when, during some seasons, as many as half a score may be counted hovering over Carmichael Hill.

OSPREY, *Pandion haliaëtus* (L.)—Mr. Plenderleith, Bowhouse, Carmichael, has kindly given me the following particulars:—"Over twenty-five years ago, Wm. Young, now dead, then gamekeeper on Carwood Estate, saw occasionally a pair of Ospreys frequenting the Clyde, and one day, when Mr. Plenderleith was in his company, the birds passed overhead, and Young fired at one, which was struck and dropped a grayling. Young came from Lochwinnoch, Renfrewshire, and knew the Osprey, having seen it there." Mr. A. Telfer has been so good as to tell me that an Osprey frequented the lochs at Douglas for two weeks in May this season, then disappearing for a week to return for another fortnight in June.

COMMON CORMORANT, *Phalacrocorax carbo* (L.)—This species occasionally visits the Clyde. A few years ago, in autumn, one was shot at the railway bridge at Pretts Mill; another was seen last autumn a little farther down the river. It also "sometimes appears on the lochs at Douglas" (Mr. Paterson's "Notes").

COMMON HERON, *Ardea cinerea*, L.—Frequents the burns and marshes. Mr. Paterson quotes the following from "Zoologist," 1872, p. 3268: "Lanarkshire—an old established heronry on large spruce firs in Glespin Wood, near Douglas. In June 1870 a single nest was taken on an island in the centre of a Loch near Douglas Castle, the seat of the Earl of Home, and in 1871 two pairs nested in a wood about a mile from this loch." There is now a heronry on an island in a loch within Douglas Policies. The nests are on spruce trees, which are thereby killed (Mr. A. Telfer). Referring to it, Mr. Paterson says ("Notes"): "There might be a dozen nests last year (1894), but Mr. Amos thinks they suffered from the great frost in January and February this year (1895), and that their numbers are reduced. I saw nine or ten birds on May 23, 1895. The birds are protected."

[**NIGHT HERON**, *Nycticorax griseus* (L.)—Mr. R. Gray saw a strange Heron, which he believes belonged to this species, frequenting the Clyde at Westraw during June 1896. It appeared to be preying upon the grayling then dying in numbers in the river.]

BITTERN, *Botaurus stellaris* (L.)—In "S. A." there is the note: "A Bittern was shot five years ago on Biggar Moss, but none have appeared since" (1835).

GEESE.—Flocks of Geese are seen occasionally by the Clyde and elsewhere, but I am not able to decide as to the species. A specimen preserved in Carmichael House almost certainly belongs to the Pink-footed species (*Anser brachyrhynchus*, Baillon). I am, as also is Mr. A. Telfer, of the opinion that this is the species which, for the main part, visits this district.

SWANS.—These occasionally visit the Clyde, as a pair of these in immature plumage—the heads of which are preserved in Eastend House—were shot there by Mr. E. Stodart about ten years ago. I am unable to decide whether they are “Whoopers” or “Bewick’s Swans.” Mr. R. Gray found a young one (dead) in the Clyde last winter.

MUTE SWAN, *Cygnus olor* (J. F. Gmelin).—There are several of these on lochs at Douglas, where they nest. Five or six years ago, in spring, a strayed pair appeared on the Clyde below Hyndford Bridge, where they remained for some time.

COMMON SHELD-DUCK, *Tadorna cornuta* (S. G. Gmelin).—Is an occasional winter visitor to the Clyde (Mr. R. Gray).

MALLARD, *Anas boscas*, L.—Common on all lochs and marshes of the district.

TEAL, *Querquedula crecca* (L.)—Not uncommon, and nesting.

WIGEON, *Mareca penelope* (L.)—Autumn and winter visitor to the Clyde, and has been found on ponds and lochs of the district.

TUFTED DUCK, *Fuligula cristata* (Leach), local name “Tappit Duck.”—This species visits in small numbers the lochs in Douglas Policies. Mr. A. Telfer informs me that there were individuals there this season as late as second week of May, to reappear again about July 20. Mr. Paterson saw one on May 23, 1895 (“Notes”).

SCAUP DUCK, *Fuligula marila* (L.)—Not infrequently seen on Clyde during winter (Mr. R. Gray).

GOLDEN-EYE, *Clangula glaucion* (L.)—This species frequents the lochs in Douglas Policies (Mr. A. Telfer), as also the Clyde (Mr. R. Gray), during autumn and winter.

GOOSANDER, *Mergus merganser* (L.)—Winter visitor to the Clyde. Two very fine specimens (both ♂), as also a ♀, shot by Mr. T. Cranston, are preserved in Carmichael House.

RING DOVE, *Columba palumbus*, L., local name “Cushie.”—Abundant.

STOCK DOVE, *Columba oenas*, L.—During the severe weather in end of January last, a pair of doves which appeared to belong to this species flew round the Manse garden and rested for some time on a beech tree. Mr. D. Pringle informs me that there

were two nests of this species this season near to his house—one 200 yards below it, the other about a quarter of a mile farther up the glen.

ROCK DOVE, *Columba livia*, J. F. Gmelin.—Common in the parish, as there are good colonies in pigeon-houses at Westmains, and dovecots at Eastend. Whatever may have been their state formerly, they are now quite undomesticated, and forage for themselves.

BLACK GAME, *Tetrao tetrix* (L.)—Fairly abundant. Chiefly in evidence when snow lies on the ground, as then it descends to lower grounds to feed on haws, etc. During the early spring this species assembles in flocks, and the cocks may be heard uttering their characteristic notes, as also seen performing their strutting antics, to prove themselves attractive to the hens. This species perches readily on high and slender twigs of beech and birch. Frequently have I watched small parties perched on the feathery sprays of a birch at the foot of the Manse garden, picking off the seeds. As late as June 12, 1897, a gray hen, accompanied by a male, rose off a nest which she was preparing, and another was seen sitting on a nest on June 21, high up on Lochyock Hill.

RED GROUSE, *Lagopus scoticus* (Latham).—There is a good and healthy stock on Tinto and the heath lands of the district. In late seasons, in company with Black Game, this species feeds largely upon the ungarnered oats.

PHEASANT, *Phasianus colchicus* (L.)—Is strongly in evidence, being extensively reared for sport from gathered as well as purchased eggs. The majority have the white collar more or less distinct, and white and piebald individuals are not uncommon. According to "S. A.," its introduction to Pettinain took place about 1835, "a vast number" having been "brought from England," which "are now finding their way into the adjoining parishes." Under Carluke ("S. A."), "Pheasants," it is said, "have increased much of late" (1838).

PARTRIDGE, *Perdix cinerea* (Latham).—Common, prolific, and robust, though during severe winters many perish. Gray ("B. W. S.") states that Alston knew in the Upper Ward of a brood of 20 young being reared by a pair. I have been told (Mr. J. Wylie) of a nest near Happendon, Douglas, in which were laid 27 eggs; of these, 25 were hatched out, and 23 young were reared. This season a bird laid 15 eggs in a nest in the Manse garden (where there is a nest every spring), of which only one egg was infertile. Though eggs hatched out well this season, most of the old birds have no following of

young. A small covey of young, about the size of sparrows, just beginning to fly, were seen on the Glebe as late as August 18, 1897.

QUAIL, *Coturnix communis* (Bonnaterre).—In "S. A." this species is reported to have been seen near Biggar, but not for many years previous to 1835.

LAND RAIL, *Crex pratensis* (Bechstein), local name "Corncrake."—May be heard, if not seen, in all the meadows and cornfields of the district, where it nests. A nest of five eggs, destroyed by hay-cutting, was taken as late as July 30, 1897, and sent to me. They were quite fresh. It was first heard this season, May 16.

WATER RAIL, *Rallus aquaticus*, L.—A specimen of this bird, shot by Mr. T. Cranston, is preserved in Carmichael House. The species is well known to all the gamekeepers in the district, and to Mr. D. Pringle.

MOOR HEN, *Gallinula chloropus* (L.), local name "Stank Hen."—Common by all the lochs and marshes. In spring it ascends the burns, and nests may be found along the course of Carmichael Burn and in the meadows of the parish.

COOT, *Fulica atra*, L.—By no means so common as the preceding in the parish, there being no sufficiently large ponds available for its resorting to as at Douglas and at Longloch, Lanark, etc.

CREAM-COLOURED COURSER, *Cursorius gallicus* (J. F. Gmelin).—It may be noted here that a specimen of this bird was shot in a grass field near Lanark on October 7, 1868, by Charles Walker, Esq., then of Braxfield House (*vide* "B. W. S.," p. 250).

DOTTEREL, *Eudromias morinellus* (L.)—Mr. D. Pringle possesses a specimen which was shot in Carluke Parish about twenty-five years ago.

GOLDEN PLOVER, *Charadrius pluvialis*, L.—Spring, summer, and autumn sojourner. From July onwards they may be seen in large flocks—sometimes in hundreds—consorting with Lapwings and Starlings until their departure.

LAPWING, *Vanellus vulgaris* (Bechstein), local name "Peesweep."—Abounds in the district during nine months of the year. The spring return takes place in the beginning of February in favourable seasons. Nesting commences by the middle of March, and is continued till the end of June, as I have seen young, freshly run, as late as the second week of July. As soon as the young can fly—about the middle of June—they assemble together, with numbers greatly increased by migrants from other quarters, and frequent the grass lands, turnip-fields,

and hillsides, and as the season advances these flocks assume large size. By September, if not earlier, there is a gradual decrease in the numbers, the incoming stream having spent itself, while emigration is increasing in force. One with a white wing appeared this spring near Cloburnwood (Mr. T. Cranston).

OYSTER-CATCHER, *Hematopus ostralegus* (L.)—Mr. R. Gray kindly informs me that two pairs frequented the Clyde during the summer of 1896.

[PHALAROPE.—Mr. A. Telfer kindly reported to me the presence of a small bird of the habits of a Redshank, which swam freely on the lochs at Douglas. In my note-book I find the following:—“August 9. Showed Mr. Telfer the plates of Phalaropes in Morris’s “British Birds,” and he at once said that the red-necked was the bird he had seen swimming on the lochs. (It may be observed, however, that the Gray Phalarope in this book is represented in winter plumage.) When walking with him towards the Castle from his house, he recognised the bird, by its note, flying up the Douglas Water. I saw the bird some 150 to 200 yards distant. The light was not good (7.15 P.M.), and the setting sun was on our backs, low down: the bird appeared dark above and whitish or light-coloured underneath. Every now and then it was uttering its note, which corresponded with ‘a low metallic *pleep, pleep*’ (H. Saunders, ‘Illustrated Manual of British Birds’). The bird is a solitary one, and every night Mr. Telfer sees it ascending the Douglas Water from the lochs.”]

WOODCOCK, *Scolopax rusticula*, L.—Regular autumn and winter visitor. Though individuals have been known to tarry through the summer, I have not known of its nesting in the parish. Mr. T. Cranston has known of it nesting on Climpy, Carnwath. Mr. Paterson has the following note: “Formerly bred, but has not done so for some years (Mr. Amos). Twenty shot on one day. This is the largest number at a time (Mr. Amos).”

COMMON SNIPE, *Gallinago caelestis* (Frenzel).—Common, and may be heard in spring and early summer anywhere in the parish and district “bleating.” On evening (very wet) August 13, 1897, on the main road west of Howford, as many as nine rose within a hundred yards.

JACK SNIPE, *Gallinago gallinula* (L.)—Regular winter visitor.

COMMON SANDPIPER, *Totanus hypoleucus* (L.)—Regular spring to autumn sojourner. Returned this season, April 25. Rarer this season. Gray has notes (“B.W.S.”) from his own observation and Alston’s on its nesting habits in Upper Ward. These are to the effect that it not infrequently nests in gardens and

orchards in the immediate vicinity of water. Occasionally nests have been found in the Manse garden (which is surrounded by a high wall), under a currant or gooseberry bush.

COMMON REDSHANK, *Totanus calidris* (L.)—Spring and summer visitant. Returned this season, March 28. Has increased in numbers within the last twelve years. "Common in Douglasdale, and on Duneaton at Crawfordjohn" (Mr. Paterson).

GREENSHANK, *Totanus canescens* (J. F. Gmelin).—An individual was shot on loch at Carluke two years ago (Mr. D. Pringle).

COMMON CURLEW, *Numenius arquata* (L.)—Common from spring to late autumn all over the district on grass, as well as heath, lands. This season (May 15) there was a nest in a field not far from the boundary of the Glebe. The young—a few weeks old—I have seen hiding in herbage along the roadside. During a snowstorm and bitterly cold gale from N.E. on January 22, 1897, a pair were seen high up and calling loudly, being driven before the wind.

BLACK-HEADED GULL, *Larus ridibundus*, L., local name "Seamew."—This species is very abundant in spring, when it follows the plough; and in summer, when on fine evenings it hawks after the Ghost-swift Moth (*Hepialus humuli*). This species nests generally throughout the district in suitable localities, on islets in the Clyde above Pretts Mill and on moors above Douglas. One of the chief haunts is a marsh of several acres extent on Robiesland Farm, Lanark. When I visited this marsh on May 19 last the birds rose in thousands screeching and screaming from their nests among the rushes and long grass. So dense was the crowd of birds that it could only be compared to a swarm of bees on the wing whilst hiving. This morass is a splendid place for a nesting haunt, being soft, deep, and treacherous from its edge, and is much favoured by Duck, Teal, Reed Bunting, as well as this species. From the banks eggs were seen in various nests, but it was impossible, without artificial means, to reach them. When the place was visited again on May 31, there was not so great a crowd of birds in the air, and the eggs appeared to be hatched out, none being seen; but many young as well as duckling were observed swimming about or hiding among the clumps of rushes.

COMMON GULL, *Larus canus*, L.—A specimen of this species, got by Mr. T. Cranston, is preserved in Carmichael House.

HERRING GULL, *Larus argentatus*, L.—This species visits the district during winter and early spring. Mr. E. Stodart sent (April 21, 1897) me a bird in immature plumage, which was destroyed on Tinto. Mr. D. Pringle has several specimens, also in immature plumage, in his collection.

LESSER BLACK-BACKED GULL, *Larus fuscus*, L.—This species makes its appearance in winter and spring over at Symington fields, on which are scattered refuse from a slaughter-house there.

PUFFIN, *Fratercula arctica* (L.)—Mr. A. W. Yuill, Lanark, informs me that a few winters ago, during a severe frost, one of this species was caught alive in a garden in Lanark. Mr. D. Pringle, who possesses a specimen, reports that this species “has been got on the Clyde.”

RED - NECKED GREBE, *Podiceps griseigena* (Boddaert). — Gray (“B. W. S.”) says, a bird of this species was obtained as far inland as the neighbourhood of Lanark.

LITTLE GREBE, *Podiceps fluviatilis* (Tunstall).—Common on the Clyde (Mr. T. Cranston), on Douglas lochs (Mr. A. Telfer), and on ponds at Braidwood and Lee (Mr. D. Pringle).

CARMICHAEL MANSE, *September 16, 1897.*

THE SPOTTED REDSHANK ON THE SOLWAY FIRTH.

By Rev. H. A. MACPHERSON, M.A.

THE Spotted Redshank (*Totanus fuscus*) is at all times a rare bird in Scotland. I never have had the pleasure of meeting any ornithologist, *except* Mr. William Evans, who could tell me that he had met with the present species north of the Border. I cannot recall any records of the occurrence of this species from any part of Scotland, except the East Coast. It seems possible, however, that further research may demonstrate that this wader occasionally visits the Clyde area. When I first began to work at the Fauna of the Solway Firth, nearly fifteen years ago, I could find no living man who had ever shot this *Totanus* on any of our salt-marshes; though all the commoner “shanks” were well known. Forty years had slipped away since the late James Cooper had last met with a Solway specimen, and *he* only met with this wader about twice in all *his* local collecting. And, indeed, several years of careful search on *my own* part proved barren of result. It was not until 1888 that Mr. W. Nicol succeeded in obtaining a local specimen for me. He had met with the

species, as he assured me, on a few occasions previously, but had never fully identified it until the occasion just mentioned. The specimen to which I refer was shot on the 18th of August 1888. Nicol saw another Spotted Redshank in the same neighbourhood on the 4th of September 1889. He did not succeed in shooting it then ; but it was shot on the following day, 5th September 1889. In 1890 another Spotted Redshank was shot on the same estuary, on the 2nd of September, by a man named Story.

No Spotted Redshanks were seen in 1891 until October, when Nicol recognised the (to *him*) familiar note of this scarce bird. He saw it several times, when working up to Wild Ducks in his punt ; but it escaped unscathed. I have no local notes of *Totanus fuscus* in 1892. Two were seen in 1893. The first of these was seen on 7th September. It remained some weeks in the neighbourhood ; but was very wild, and would never allow Nicol to get within shot. The other was shot by a young lad on the 7th of September. This is one of the many specimens which I have had the pleasure of presenting to the Carlisle Museum. No Spotted Redshanks were detected in 1894. In 1895 a single bird of this species appeared in the customary haunts towards the end of August. Nicol often saw it, but could never get within shot. No Spotted Redshanks were discovered in 1896—a year in which the Ruff (*Machetes pugnax*) visited the salt-marshes of the English Solway in unusual numbers. In 1897 Nicol met with a Spotted Redshank in the second week of August. He could easily have shot it, had he had a gun, but he was fishing ; and illness prevented his searching for it afterwards.

On the 13th of September 1897 a Spotted Redshank was seen by James Smith on a salt-marsh a few miles higher up the Solway. He and another wild-fowler watched it feeding in the creeks for more than half an hour (they had no gun with them). Nicol thinks that *this* may have been the identical bird that he saw about a month earlier, as it was tamer than usual. We have thus given chapter and verse for the occurrence of at least eight Spotted Redshanks in the neighbourhood of the Solway Firth between 1888 and 1897, a single *decade* (I have mislaid the date upon which

Nicol saw a Peregrine chasing another Spotted Redshank towards the Scottish foreshore). Four of the number have been shot. Three of these are in the Carlisle Museum. These specimens are in immature plumage. Indeed the scanty data at our disposal refers exclusively to young birds, which are more likely to stray from the usual lines of migration than old birds. I notice that Mr. Howard Saunders speaks of the Spotted Redshank as being more partial to fresh water than the Common Redshank. Indeed he observes that the Dusky Redshank "is seldom seen by the sea." I do not suggest that the Spotted Redshank is partial to the open sea-coast; probably it prefers sheltered situations. But it is only fair to say that the specimens seen on the Solway have frequented the shores and creeks of a sandy estuary. They have fed alike on the scaurs or mussel-beds, on the soft sand under the edge of the marshes, and in the semi-liquid mud of the marsh creeks; never, however, venturing into any very narrow ditches. I have been unlucky in dissecting Spotted Redshanks; for I have rarely found anything but grit in their stomachs. In 1887 I purchased no fewer than fifteen Spotted Redshanks at once in Leadenhall Market. Some were young, others old birds moulting into winter plumage. They were bought on the 10th of September, when they were not fresh enough to make good skins. In 1889 I bought two out of a bunch of twenty hanging up in Leadenhall. These were asserted to have been killed on the east coast of England, but were too stale to preserve. The local bird which I dissected in 1888 had been feeding on little fishes: its stomach was full of the minute bones of its prey. I have never had any opportunity of searching for the Spotted Redshank in the area of the Scottish Solway; but it surely ought to be found upon the north side of the Frith? At the same time, it must be admitted, that there is only one bit of estuary upon the English side of the Solway which appears to be congenial to this interesting species. The late James Smith of Rockliffe was quite as accurate, in identifying the notes and flight of waders, as Mr. Nicol. Yet the former shot over the creeks and foreshore of the upper marshes of the Solway for at least thirty years, without ever

meeting with the Spotted Redshank. The wariness which it often, though not invariably, exhibits, may partly account for our imperfect knowledge of the visits which it pays to the British Isles.

TUFTED DUCK IN SOLWAY.

By ROBERT SERVICE.

IT is just a little more than ten years ago since I found the Tufted Duck breeding in this district for the first time. Particulars of the event were given in the "Zoologist" for 1887, p. 342. Since that period the species has spread throughout our area till every suitable loch, I think, has now at least a pair or two on or near its precincts.

Loch Kindar, which lies snugly under the eastern slopes of Criffel, has been one of the last localities to be taken up. Now, however, the Tufted Duck has found out the attractions of this famous trout loch. There are no pike, and consequently the greatest source of destruction to the young ducklings will be absent. Early in June, Mr. Willie Thomson, who looks after the angling interests of Loch Kindar, sent me word that there were some strange ducks on the loch he wished me to see. Getting there on the evening of 10th June, we were soon out in one of the boats, steering for the ancient crannoge which, in its little round mass of greenery marks a picturesque portion of the loch. Like most such remains of prehistoric times, this crannoge is made of large stones resting on piles. The Kindar crannoge has a broad rim of stones above water. From the high-water line it bears an exceedingly dense and most luxuriant mass of brambles, which are laced and interlaced in an inextricable tangle almost impenetrable to hand or foot. The whole structure is not above 20 to 25 feet across. The pair of stranger ducks had been seen in proximity to this islet, and we concluded they must be nesting thereon. Landing upon it, we proceeded to search as well as we could by peering down into the dense mass of brambles wherever they were a little thinner than usual. In a minute out scuttled a duck from a rabbit-hole-like passage in the

vegetation. She was only a Mallard. A peep at her nest revealed the fact that she was sitting on nine eggs—or, to be quite correct, six eggs, for three had already hatched, and the young were crouching meekly down in the inside of their recently enveloping shells. On the other side of the crannoge we found in another minute the Tufted Duck slipping out through a narrow passage in the briars from a nest which closer examination disclosed as containing ten eggs, the last of which appeared to be newly laid. We made our further stay as brief as possible, so as not to interfere with the domestic cares of these two most interesting avian households.

One week later I paid a visit to Lochrutton, the centre from which, so far as I know, this district has been colonised by the Tufted Ducks. It was here I found them breeding in 1887. The species has increased from the original one, or perhaps two, pairs of ten years ago, till on my visit referred to I counted, with the aid of the binoculars, upwards of forty males upon the loch. Dotting the smooth surface of the water at intervals all over the loch, hardly two of them could be said to be in company. There can be little doubt the great majority of these males had mates brooding around the loch margins. So many of the species at that period of the year was a sight to gladden the soul of any ornithologist; and, seen in the rays of the western sun on a calm evening, with the light shining on their white breasts, the spectacle could not but be gratifying to a lover of nature. Satisfying as this sight was, I must still find out something more. So, in company of a neighbouring farmer and his son, we proceeded to search for nests. At the south end of the loch are situated a good many acres of reeds and mud and sedges interspersed with deep pools of water. Very little of it is traversable by wading, and on most of it a boat is impossible. Nevertheless, by some "engineering" unnecessary to describe, we managed access to a little space that might be considered a sort of island in the midst of the reeds and sedges. It was covered with small willows, coarse grasses, and a thick growth of long rushes. In size it was not much bigger than an ordinary dining-table, and so little above the surrounding water that some of the eggs

examined subsequently were scarcely clear of it. Ducks flew off as we went upon the place, emitting their guttural calls of *kur-rook, kur-rook, kur-rook*, as they got away. No less than five nests were on this little spot, all at distances of about four feet from each other, and snugly ensconced under clumps of rushes. They contained respectively thirteen, eight, thirteen, ten, and seven eggs; great variation in shape and colour being noted. One nest had the eggs extremely pale in colour. Two of the eggs in the first nest of thirteen were bright green, and all were greatly elongated in shape. On the small islands in the loch itself we found four other nests, containing nine, thirteen, ten, and six eggs respectively.

Altogether the status of the Tufted Duck at Lochrutton is most satisfactory. The hatch-out this season has been very successful. The only hindrances to their prosperity are the pikes, which annually take toll of at least three-fourths of the newly hatched young. The locality (quite apart from the restrictions imposed by the Wild Birds' Preservation Acts) is fully preserved, and I have to acknowledge indebtedness to my friend Mr. George Robson, the game tenant, for the privilege of unrestricted inspection.

RARE BRITISH ANIMALS RECENTLY ADDED TO THE EDINBURGH MUSEUM OF SCIENCE AND ART.

By R. H. TRAQUAIR, M.D., LL.D., F.R.S.,
Keeper of the Natural History Department.

SIX - GILLED GRAY SHARK, *Notidanus griseus*, Gmel.—A specimen 4 feet 8 inches in length caught off the island of Rona on 10th April of this year. Obtained for the Museum through Mr. George Sim, Aberdeen.

BONITO, *Thynnus pelamys*, Linn.—A specimen 20 inches in length caught by Mr. Edward M'Coll, fisherman, in a "whammle" net in the Nith channel on the 2nd August last. Well known as an inhabitant of the tropical and warmer parts of the Atlantic and Indian Oceans, the Bonito

must be reckoned among the rarer visitants of our British shores. According to Mr. Service, through whose good offices the specimen was presented to the Museum by Mr. M'Coll, this species has only occurred three times previously in the waters of Dumfries or Galloway.

FRIGATE PETREL, *Pelagodroma marina* (Lath.)—The occurrence of this bird on the island of Colonsay on the 1st January of this year has been already recorded in the April number of this journal (p. 88) by Mr. W. Eagle Clarke, who, however, omitted to state that the specimen had been acquired by the Museum of Science and Art.

THICKNEE, *Edicnemus scolopax* (Gmel.)—A young female specimen was shot at Muirhouse, on the 12th August last, by Mr. Ripley Ker of Dugalston, Milngavie, and by him presented to the Museum. Though a well-known summer visitor to the southern parts of England, the Thicknee becomes rare in the north, and the present is only the second record of its occurrence in Scotland, a specimen having been killed near St. Andrews in 1858.

GREAT BUSTARD, *Otis tarda*, Linn.—The specimen recorded in the "Ann. Scot. Nat. Hist." for 1892, p. 138, as having been shot at Housebay, Stronsay, Orkney, has now been acquired by the Museum.

HONEY BUZZARD, *Pernis apivorus* (Linn.)—A male in immature plumage was shot by a crofter at Balta Sound, Shetland, on 29th or 30th July, and was acquired for the Museum through Mr. Small, Edinburgh, to whom it was sent to be stuffed.

THE HARDIE COLLECTION OF FOSSILS.

By R. H. TRAQUAIR, M.D., LL.D., F.R.S.

THE Edinburgh Museum of Science and Art has recently acquired the valuable collection of fossils from the Upper Silurian rocks of the Pentland Hills, made by the late Mr. David Hardie, Bavelaw. This collection is noteworthy, as containing the largest and most important representation

ever brought together of the fossils from the "Eurypterid-bearing" beds of Gutterford Burn, near Carlups, whose remarkably fossiliferous character was first discovered by Mr. John Henderson, a well-known Edinburgh geologist. And it was from specimens obtained by the Museum from Mr. Henderson that Professor Malcolm Laurie, a few years ago, described five new species and one new genus of the interesting extinct group of Eurypterida.

Mr. Hardie was an enthusiastic collector, and devoted much patient work to bringing together this important collection, which is now the property of the nation. It consists of 866 specimens in all, mostly from Gutterford Burn, though a certain number are from the North Esk.

Naturally the most interesting of the Gutterford fossils are the Eurypterida, represented by 237 specimens, both entire and fragmentary, of species of *Eurypterus*, *Stylonurus*, and *Drepanopterus*. Here there is material for a considerable extension of our knowledge of the details of the species concerned. Of the remaining fossils from this locality, the most numerous are Echinoderms, though Trilobites, Mollusca, Brachiopoda, and Graptolites are also represented.

Only 132 specimens are from the North Esk beds, and these are chiefly remarkable for the fine series of the sponges *Plectoderma scitulum* and *Amphispongia oblonga* which they contain. An interesting series of sections of the limestone pebbles of Silurian age, and containing corals, which occur in the Lower Devonian Conglomerate of the Pentland Hills also forms part of the collection.

A LIST OF SPIDERS COLLECTED IN "UPPER FORTH."

By GEORGE H. CARPENTER, B.Sc., and WILLIAM EVANS, F.R.S.E.

[INTRODUCTORY NOTE BY W. EVANS.—In the course of the past eight years I have paid a number of visits to the district of "Upper Forth" for the purpose of investigating its fauna, and on several of these occasions the Spiders have received

a considerable share of attention, with the results embodied in the following list. My investigations have been made mainly around two centres,—Callander and Aberfoyle,—and for the most part in the months of April, May, and September. A few weeks' diligent search at other seasons of the year, especially during late autumn and winter, when many of the small *Theridiidæ* reach the adult state, would no doubt have materially lengthened the catalogue of species, but hitherto I have not been able to spare the necessary time for this. In 1861 the Rev. O. P. Cambridge spent a couple of days (30th June and 1st July) at the Trossachs collecting Spiders (*vide* "Zoologist" for 1862, and "Entomologist" for 1877), and obtained four species which as yet I have not found in the district: these we have inserted in their proper places.

The present list contains 125 species, but future research ought to well-nigh double the number; for the district, with its warm valleys, and hillsides clothed with heather, juniper, oak copse, birch, bog myrtle, etc., has few superiors in Scotland. Of the 125 species here recorded, sixteen are not in our Edinburgh District list ("Proc. Roy. Phys. Soc.," xii. pp. 527-590, and xiii. pp. 308-315), while one—*Episinus truncatus*—does not appear to have been previously detected in Scotland. Taking our Edinburgh list, which now contains 180 species,¹ to represent "Lower Forth," we have thus a total of 196 recorded for the whole of "Forth." To this should perhaps be added about half a dozen species from the north-east corner of Berwickshire recorded in Dr. Hardy's lists, which we have not yet found within the watershed.

I have again been fortunate in securing the co-operation of my friend Mr. Carpenter of the Dublin Museum in the most important part of the work, namely, the proper identification of the specimens collected; and we have jointly to thank the Rev. O. P. Cambridge, F.R.S., for the continuation of his assistance in cases of difficulty.]

¹ This includes *Prosthesima electa*, C. L. K., discovered on Largo Links last June.

SYSTEMATIC LIST OF SPECIES.

(Arrangement and nomenclature as in our previous lists of Scottish Spiders. Species not in our Edinburgh list are marked with an asterisk.)

DYSDERIDÆ.

HARPACTES HOMBERGII (*Scop.*)—Trossachs, July 1861 (Rev. O. P. Cambridge).

SEGESTRIA SENOCULATA (*Linn.*)—Bridge of Allan, December 1893 ; Callander, May 1894 ; Aberfoyle, Duchray, etc., May 1896.

OONOPS PULCHER, *Templ.*—Aberfoyle, September 1897, ♀.

DRASSIDÆ.

MICARIA PULICARIA (*Sund.*)—One, ♀, Pass of Aberfoyle, 19th April ; another, ♂, Duchray, 8th May 1896.

DRASSUS TROGLODYTES, *C. L. K.*—Two or three near Aberfoyle, May 1896 and September 1897.

DRASSUS CUPREUS, *Bl.*—Callander, Aberfoyle, Loch Chon, etc., common. A number of more or less immature ♂s and ♀s, obtained about Aberfoyle in April and May 1896, have been submitted to the Rev. O. P. Cambridge, who unhesitatingly refers them to this form.

CLUBIONA TERRESTRIS, *Westr.*—Bridge of Allan, Callander, Aberfoyle, common ; adult ♂s and ♀s, 29th April 1896.

CLUBIONA RECLUSA, *Cb.*—Callander and Aberfoyle. In the latter locality adult ♀s were obtained in June and September ; and an adult ♂ on 12th Sept. 1897.

CLUBIONA PALLIDULA, *Clk.*—Callander, May 1889, an adult ♂.

CLUBIONA PHRAGMITIS, *C. L. K.* = *C. holosericea*, De G.?, Cambr. "Spid. Dorset."—An ad. ♀ under bark on an old paling near Callander, 13th May 1894 ; and an immature ♀, probably of this species, Aberfoyle, September 1897.

CLUBIONA COMPTA, *C. L. K.*—Aberfoyle, April, May, and September—an ad. ♂ on 27th May 1896.

CLUBIONA TRIVIALIS, *L. K.*—Common on furze, juniper, etc. ; adults of both sexes, Callander, 13th May ; ad. ♀, Aberfoyle, April, ♂s, September.

CLUBIONA DIVERSA, *Cb.*—Bridge of Allan, December 1893, several adults of both sexes ; Aberfoyle, September 1897, one or two immature.

*CHIRACANTHIUM CARNIFEX (*Fabr.*) = *C. erraticum* (Wlk.)—Callander, 4th and 11th May 1894, a few, still immature ; on

heather between Aberfoyle and the Trossachs, etc., May 1896, not uncommon (first ad. ♂ and ♀ noticed on the 6th); Aberfoyle, September 1897, a few immature examples.

ZORA SPINIMANA (*Sund.*)—Common among dead leaves in oak woods, Aberfoyle, in April and May 1896—some ♀s adult by end of April; again common in second week of September 1897, but no adults seen.

**ANYPHÆNA ACCENTUATA* (*Wlk.*)—Two ♂s and two ♀s, all adult, and a number of immature specimens were beaten off oaks about Aberfoyle on 23rd and 26th May 1896; in September 1897 immature examples were common. Has been taken by Dr. Hardy in the Pease Dean, Berwickshire.

**AGROËCA BRUNNEA* (*Bl.*)—Aberfoyle, April 1896, an immature ♀; and on 12th September 1897 an adult ♂ and two ♀s.

DICTYNIDÆ.

DICTYNA ARUNDINACEA (*L.*)—Abundant on heather, juniper, etc.; at Callander in 1894, ad. ♂s were first noticed on 4th May; and at Aberfoyle in 1896 adults of both sexes, on 19th April.

AMAUROBIUS FENESTRALIS (*Str.*)—Abundant around Callander, Aberfoyle, etc. Near Callander, early in May 1894, a female was found beside a batch of 150 eggs, apparently her own.

AMAUROBIUS SIMILIS (*Bl.*)—A few, including an ad. ♀, in house at Callander, May.

AGELENIDÆ.

CRYPHÆCA SYLVICOLA, *C. L. K.*—Bridge of Allan, December, a good many, both adult and immature; Callander, May, a few adults and immature examples of both sexes.

TEGENARIA DERHAMII (*Scop.*)—Common in houses.

TEXTRIX DENTICULATA (*Oliv.*)—Callander, Aberfoyle, etc. An ad. ♂ and several ♀s were obtained near Callander on 6th May 1894.

THERIDIIDÆ.

ERO FURCATA (*Vill.*)—Near Aberfoyle, May 1897.

**EPISINUS TRUNCATUS*, *Walck.* = *Theridion angulatum*, *Bl.* "Spid. Gt. Brit. and Irel."—On 19th April 1896 a male and two females, all still immature, of this addition to the Scottish list were dislodged from underneath a tuft of heather growing on a rock near the Pass of Aberfoyle.

THERIDION LINEATUM (*Clk.*)—Callander, May 1894, young fairly common; Aberfoyle, 13th September 1897, a few ♀s beside their egg-cocoons; Trossachs (O. P. C.)

THERIDION TEPIDARIORUM, *C. L. K.*—Orchid-houses, Bridge of Allan, December 1893, adults and young.

THERIDION SISYPHIUM (*Clk.*)—Abundant on juniper bushes, etc., Callander, 5th May 1894, mostly immature, but some of both sexes already adult; Aberfoyle, May and June 1897, adults common.

THERIDION PALLENS, *Bl.*—Callander, 5th May 1894, a few ad. ♂s on furze, and on 11th adults of both sexes numerous on wire fence; Aberfoyle, September 1897, a few, immature.

PHOLCOMMA GIBBUM (*Westr.*)—An ad. ♂ and several ♀s among leaves, Aberfoyle, 12th September 1897.

PEDANOSTETHUS LIVIDUS (*Bl.*)—Callander and Aberfoyle, adults of both sexes in April and May; ad. ♂ in September.

TAPINOPA LONGIDENS (*Wid.*)—Near head of Loch Katrine, 1st July 1861 (O. P. C.)

BOLYPHANTES LUTEOLUS (*Bl.*)—Aberfoyle, 12th September, a few, all immature but one ♂. Apparently much less common than in "Lower Forth."

DRAPETISCA SOCIALIS (*Sund.*)—Aberfoyle, 11th September, a few ad. ♀s; Trossachs (O. P. C.)

LINYPHIA INSIGNIS (*Bl.*)—Bridge of Allan, December, an ad. ♀; Aberfoyle, 12th September, common, but only one adult, a ♂, noticed.

LINYPHIA LINEATA (*L.*)—Trossachs, July 1861 (O. P. C.)

LINYPHIA CLATHRATA, *Sund.*—Bridge of Allan, Aberfoyle, etc., common—adults in December and May.

***LINYPHIA MARGINATA**, *C. L. K.* = *L. triangularis*, *Bl.* "Spid. Gt. Brit. and Irel."—Several specimens were obtained by the Rev. O. P. Cambridge "in angles and interstices of the rocky banks" of Loch Katrine, on 1st July 1861.

LINYPHIA MONTANA (*Clk.*)—Callander, May 1894, two ♂s and two ♀s adult, and several half grown, beaten off juniper bushes; Duchray, near Aberfoyle, 27th May 1896, an ad. ♂.

LINYPHIA TRIANGULARIS (*Clk.*)—Callander, Aberfoyle, etc.; adults, especially ♀s, common in September.

LINYPHIA PELTATA, *Wid.*—Bracklyn Falls, near Callander, 5th May 1894, three ad. ♂s and an imm. ♀; Pass of Leny, 11th May, several ad. ♂s.

LINYPHIA PUSILLA, *Sund.*—Callander, May 1894, ♀; Aberfoyle, April 1896, ♂; September 1897, immature examples common.

LABULLA THORACICA (*Wid.*)—Bridge of Allan, Callander, and Aberfoyle; ad. ♀s in May.

- LEPTYPHANTES MINUTUS (*Bl.*)—Bridge of Allan, December 1893, one or two ♀s; Trossachs, July 1861 (O. P. C.)
- LEPTYPHANTES TERRICOLA (*C. L. K.*) = *L. alacris* (*Bl.*)—Bridge of Allan, January 1894, a few; Callander, May, two ♀s.
- LEPTYPHANTES OBSCURUS (*Bl.*)—Callander, 13th May 1894, one or two ♀s.; Aberfoyle, September 1897, ♀.
- LEPTYPHANTES CRISTATUS, *Menge.*—Bridge of Allan, December 1893, an ad. ♂.
- LEPTYPHANTES BLACKWALLII, *Kulcz.* = *L. terricola* (*Bl.*) = *L. zebrina*, Cambr. "Spid. Dorset."—A few of both sexes obtained in the neighbourhood of Aberfoyle in May 1896—identification confirmed by the Rev. O. P. Cambridge.
- LEPTYPHANTES TENUIS (*Bl.*) = *L. tenebricola*, Cambr., *non*. Wid.—Callander, May 1894, and Aberfoyle, April and May 1896, a number of adults of both sexes. Several specimens were sent to Mr. Cambridge, who confirmed our identification.
- LEPTYPHANTES ERICÆUS (*Bl.*)—One or two at roots of heather near Aberfoyle, September 1897.
- BATHYPHANTES VARIEGATUS (*Bl.*)—Callander, May, adults of both sexes common; Aberfoyle, September, a few immature.
- BATHYPHANTES CONCOLOR (*Wid.*)—Callander, 6th May, an ad. ♀; Aberfoyle, May, three ad. ♂s. Apparently rare compared with what it is in "Lower Forth."
- BATHYPHANTES APPROXIMATUS (*Ch.*)—A number of ad. ♂s and ♀s in a swamp between Callander and Doune, 6th May 1894.
- BATHYPHANTES NIGRINUS (*Westr.*)—Aberfoyle, April, an ad. ♀; September, several immature.
- BATHYPHANTES DORSALIS (*Wid.*)—Callander, many adults of both sexes off juniper bushes in May; Aberfoyle, a few adults in May, many immature in September.
- BATHYPHANTES GRACILIS (*Bl.*)—Aberfoyle, 12th September 1897, several, one ♂ adult.
- PORRHOMMA PYGMÆUM (*Bl.*)—Pendreich, near Bridge of Allan, 31st December 1893, an ad. ♂ and several immature.
- TMETICUS ABNORMIS (*Bl.*)—Callander, May 1889, one; wood at foot of Callander Craig, May 1894, an ad. ♀ beside a cocoon, containing 20 eggs, on under side of a stone; Loch Chon, 27th April 1896, another ad. ♀.
- TMETICUS RUFUS (*Wid.*)—Bridge of Allan, December, one; Callander Craig, several under stones in wood, May; Aberfoyle, May, two—all ad. ♀s.
- TMETICUS HUTHWAITHII (*Ch.*)—One ♀, Aberfoyle, May 1896—species determined by O. P. C.

TMETICUS BICOLOR (*Bl.*)—Bridge of Allan, December; Callander, May, a few ♀s.

MICRONETA FUSCIPALPIS (*C. L. K. ?*), Cambr. "Spid. Dorset."—An ad. ♂, Aberfoyle, May 1897.

MICRONETA INNOTABILIS (*Ch.*)—Bridge of Allan, December 1893, one; Aberfoyle, May 1896, a few, September, one—all ♀s.

MICRONETA VIARIA (*Bl.*)—Bridge of Allan, December, ♂; Callander, May, ♂; Aberfoyle, April and May, two ♂s and two ♀s—all adult.

GONGYLIDIUM DENTATUM (*Wid.*)—Callander, May, ♀; Aberfoyle, April, ♂ and two ♀s—adult.

GONGYLIDIUM FUSCUM (*Bl.*)—One ♀, Aberfoyle, May 1896—species determined by O. P. C.

**GONGYLIDIUM APICATUM* (*Bl.*) = *Neriene apicata*, Bl. "Spid. Gt. Brit. and Irel.," and Cambr. "Spid. Dorset."—Two ♂s (adult) and one ♀ (not quite mature) among shingle by the Duchray Water, a little above the Milton of Aberfoyle, 4th May 1896. Has been taken near Paisley by Mr. Morris Young.

ERIGONE ATRA (*Bl.*)—A few ad. ♂s on footpath near Callander, 9th May 1894; Aberfoyle, ♀, May 1896.

ERIGONE DENTIPALPIS (*Wid.*)—Callander and Aberfoyle, several ad. ♂s and ♀s in May; Aberfoyle, ad. ♂, September 1897.

LOPHOMMA PUNCTATUM (*Bl.*)—In Marsh near Doune, May 1894, ♀.

GONATUM RUBENS (*Bl.*)—Common; Bridge of Allan, Callander, Aberfoyle, etc.; ad. ♂s observed only in September and December.

GONATUM RUBELLUM (*Bl.*)—Duchray, May 1896, ad. ♀; Aberfoyle, September 1897, one or two ad. ♂s.

GONATUM BITUBERCULATUM (*Wid.*)—Near Doune, May 1894, an ad. ♂ and two ♀s; Aberfoyle, April, and Duchray, May 1896, two ♀s.

DISMODICUS BIFRONS (*Bl.*)—An ad. ♂ and several ♀s off whins on hillside near Callander, 5th May 1894.

DIPLOCEPHALUS CRISTATUS (*Bl.*)—An ad. ♂, Aberfoyle, April 1896.

SAVIGNIA FRONTATA, *Bl.*—Bridge of Allan, December 1893, a few adults of both sexes.

PEPONOCRANIUM LUDICRUM (*Ch.*)—Several adults of both sexes off whins on hillside near Callander, May 1894; Aberfoyle, April 1896, ♂.

PLÆSIOCRÆRUS PERMIXTUS (*Ch.*)—Aberfoyle, April 1896, ad. ♂ and ♀.

PLÆSIOCRÆRUS FUSCIPES (*Bl.*)—Aberfoyle, among dead leaves, September 1897, a good many adults of both sexes.

PLÆSIOCRÆRUS ALPINUS (*Ch.*)—Aberfoyle, April 1896, an ad. ♂.

WIDERIA ANTICA (*Wid.*)—Aberfoyle, April 1896, ♀.

WALCKENAËRA ACUMINATA, *Bl.*—Callander, May, and Aberfoyle, April, several ad. ♀s; Bridge of Allan, December, two ad. ♂s; Aberfoyle, September, two ad. ♂s.

CERATINELLA BREVIS (*Wid.*)—Bracklyn Falls, near Callander, ad. ♂, 5th May; Leny, ad. ♂ and several ♀s, 11th May 1894.

CERATINELLA BREVIPES (*Westr.*)—Aberfoyle, September 1897, two ad. ♀s, apparently of this species.

MASO SUNDEVALII (*Westr.*)—Bridge of Allan, December 1893, one ♀.

EPEIRIDÆ.

PACHYGNATHA CLERCKII, *Sund.*—Callander, May 1889, and Aberfoyle, May 1896, ad. ♀s; Aberfoyle, September 1897, adults of both sexes.

PACHYGNATHA DEGEERII, *Sund.*—Bridge of Allan, December ♀; Callander and Aberfoyle, April and May, adults of both sexes common; Aberfoyle, September, many immature.

**META MENARDI* (*Latr.*) = *Epeira fusca*, *Bl.*, "Spid. Gt. Brit. and Irel."—In Rob Roy's Cave, Loch Ard, 29th April 1896, two ♂s and three ♀s adult and a few immature examples of this large and interesting spider were captured and a good many more seen. Mr. Cambridge obtained specimens at the foot of Ben A'an, Trossachs, on 30th June 1861.

META SEGMENTATA (*Clk.*)—Aberfoyle, April, ad. ♂; Callander, May, common, but mostly immature; Aberfoyle, September, adults of both sexes abundant.

META MERIANÆ, *Scop.*—Callander, May, common, a few adults, but mostly immature and young; Aberfoyle, April, an ad. ♂, September, a number immature.

**TETRAGNATHA EXTENSA*, *L.* (as now restricted).—When Mr. Fred. O. P. Cambridge was working at this genus in 1895, he referred some specimens obtained by us near Callander in 1894 to this form, and among a number of specimens since collected at Aberfoyle in April and September we believe there are a few more, but being immature it is difficult to speak of them with certainty.

**TETRAGNATHA PINICOLA*, *L. Koch.*—A few *Tetragnathæ*—among them an ad. ♂—taken on heather by the roadside between Aberfoyle and the Trossachs in May 1896 have been referred by the Rev. O. P. Cambridge to this form.

CYCLOSA CONICA (*Pall.*)—An ad. ♀ on boxwood hedge in the garden at Duchray Castle, near Aberfoyle, 27th May 1896.

**SINGA HAMATA* (*Clk.*) = *Epeira tubulosa*, Bl. "Spid. Gt. Brit. and Irel."—On 4th and 11th May 1894 a ♂ and seven ♀s, all more or less immature, of this rare and local spider were found in their small silken retreats on burnt heather on the moor behind Callander Hydropathic. On 1st May 1896 a few more immature examples were detected on old heather between Aberfoyle and Duchray, and on 24th May a number of adult ♀s were obtained between Aberfoyle and the Trossachs. The species has been recorded from near Castle Douglas ("Entomologist," 1877, p. 202).

ZILLA X-NOTATA (*Clk.*)—In a small collection of Callander Spiders, received from Mr. A. Forrester a few years ago, this species occurred (*vide* "Annals," 1893, p. 224); but we have not yet ourselves met with it for certain. In September 1897 *Zillæ* were common at Aberfoyle on wooden palings, stone walls, and in the upper angles of doors and windows (as well as on bushes, etc.); but, notwithstanding the nature of the habitat, all the adults we examined were clearly referrible to the next species, the long palpi of the males rendering *their* identification extremely easy. Such habitats are probably those to which *x-notata* practically confines itself; but our experience both in Upper and Lower Forth shows that *atrica* also may frequently be found in them, and is not to be looked for exclusively on shrubs and bushes, as Mr. Cambridge's remarks in his "Spiders of Dorset" would seem to imply.

ZILLA ATRICA (*C. L. K.*)—Bridge of Allan, Callander, Aberfoyle, etc., abundant on whin, juniper, and other bushes; also, as mentioned above, on walls, buildings, and wooden fences; ad. ♂s in August and September, ♀s for some time longer.

EPEIRA CUCURBITINA (*Clk.*)—Callander and Aberfoyle, May, a few immature; Duchray, 27th May 1896, an ad. ♀; Aberfoyle, September 1897, an ad. ♀, and several small ones.

EPEIRA DIADEMATA (*Clk.*)—Common, especially in the young state; adults of both sexes, Callander, Aberfoyle, etc., in August and September.

EPEIRA CORNUTA (*Clk.*) = *E. apoclisæ*, Bl. "Spid. Gt. Brit. and Irel."—Not uncommon in the immature state about Callander in May 1894, and around Aberfoyle in April and May 1896; but a few adults, including one or two males, were obtained.

**EPEIRA QUADRATA* (*Clk.*)—Of this remarkably fine spider a few scarcely half grown examples were met with near Callander in May 1894; and in September 1897 a good many adult females,

and also a few small ones, were found on bog-myrtle and heather near Aberfoyle.

EPEIRA UMBRATICA (*Clk.*)—Two ad. ♀s under bark on dead mountain ash at Duchray, near Aberfoyle, 8th May 1896.

THOMISIDÆ.

XYSTICUS CRISTATUS (*Clk.*)—Common, and at all stages, in every locality examined.

XYSTICUS BIFASCIATUS (*C. L. K.*)—On 13th September 1897 two examples—an ad. ♀ and a ♂ not quite mature—of this large and uncommon "crab" spider were beaten off bog-myrtle near Aberfoyle.

OXYPTILA TRUX (*Bl.*)—An ad. ♂ near Callander, 23rd April 1892; and a few immature specimens at Aberfoyle in September 1897.

OXYPTILA ATOMARIA (*Panz.*)—An imm. ♀, Aberfoyle, September.

PHILODROMUS AUREOLUS (*Clk.*)—Common on whin and juniper bushes; adults at Aberfoyle in June 1897.

TIBELLUS OBLONGUS (*Wlk.*)—Banks of Loch Chon, 27th April 1896, ♀ not quite adult; Aberfoyle, September 1897, several immature.

LYCOSIDÆ.

**OCYALE MIRABILIS* (*Clk.*) = *Dolomedes mirabilis*, Bl. "Spid. Gt. Brit. and Irel."—Of this handsome species a few ad. ♂s. and some quite small specimens were captives round about Aberfoyle in the end of April and the beginning of May 1896; in 1897 an ad. ♂ was got at Aberfoyle on 16th May, and a half-grown ♀ in September. Mr. Cambridge met with it at the foot of Ben A'an in 1861.

PIRATA PIRATICUS (*Clk.*)—Aberfoyle, April 1896, a number of small and half-grown ones; June 1897, a few adults; 12th September, a ♀ with a score of newly hatched young clinging to her body.

**TROCHOSA LEOPARDUS* (*Sund.*) = *Lycosa cambrica*, Bl. "Spid. Gt. Brit. and Irel."—On 15th April 1896 a ♂, not quite mature, was found under a stone in a marshy spot at the Pass of Aberfoyle.

TROCHOSA RURICOLA (*De G.*)—An ad. ♀ under a stone in grass field east of Aberfoyle, 21st April; and another among shingle by the Duchray Water, 4th May 1896.

TROCHOSA TERRICOLA, *Thor.*—Callander, May, several imm.; Aberfoyle, April, two ad. ♂s; September, a few adults of both sexes.

TROCHOSA PULVERULENTA (*Clk.*)—Common, both in the immature and adult states, in May; a few half grown in September.

TROCHOSA ANDRENIVORA (*Clk.*)—On hillside to east of Aberfoyle, 21st April 1896, a pair adult.

LYCOSA AMENTATA (*Clk.*)—Common in every locality examined; adults in April, May, and June. At Callander in 1894 a few were carrying egg-cocoons by 9th May.

***LYCOSA AGRICOLA**, *Thor.* = *L. fluviatilis*, *Bl.* "Spid. Gt. Brit. and Irel."—Adults of both sexes were common on shingle by the Duchray Water, about two miles from Aberfoyle, on 4th May 1896.

LYCOSA LUGUBRIS, *Wlk.*—On warm sunny days in May and June this species was met with in great abundance running among the dead leaves in the oak woods around Callander and Aberfoyle: both sexes were then adult, but a few females were still to be seen carrying egg-cocoons in the middle of September.

LYCOSA PULLATA (*Clk.*)—This was also very plentiful, preferring, however, more open situations.

LYCOSA NIGRICEPS, *Thor.*—Rather common among grass and heather: Bridge of Allan, Callander, Aberfoyle, etc.; adults of both sexes obtained during first week of May.

***LYCOSA HERBIGRADA**, *Bl.*—This form is represented in the collection by a ♀ taken in an old pasture between Aberfoyle and Port of Menteith in the end of April 1896.

LYCOSA PALUSTRIS (*L.*)—Bridge of Allan, Callander, Aberfoyle, etc., common in old pastures; adults in end of April and beginning of May.

ATTIDÆ.

EPIBLEMUM SCENICUM (*Clk.*)—Aberfoyle, April, several immature; September, a few adult ♀s.

***HASARIUS FALCATUS** (*Clk.*) = *Saliciscus coronatus*, *Bl.* "Spid. Gt. Brit. and Irel."—Three specimens, all ♀s, were captured in the vicinity of Aberfoyle on three separate occasions, namely, on the 19th April 1896, 2nd June 1897, and 12th September 1897. The last was immature, the others adult.

NEON RETICULATUS (*Bl.*)—Half a dozen, including two ad. ♀s, among dead leaves in wood behind Aberfoyle, September 1897.

EUOPHRYS ERRATICUS (*Wlk.*)—One ♀, near Callander, May 1889.

FLORULA OF A PIECE OF WASTE GROUND
AT ABERDEEN.

By JAMES W. H. TRAIL, A.M., M.D., F.R.S.

IN this journal, in October 1896 and January 1897, under the above title, I gave an account of observations made by me during the years 1893-96, my object being to follow out the changes that can be traced from year to year in the vegetation of a newly made-up soil when protected from injury and left almost untouched by man. I have continued these observations this year (1897); and the results will be found stated below.

During the past winter and summer the space covered with cinders has been somewhat added to; and the heaps of earthy rubbish having been mostly removed from beside the lines of rails the plants growing on them alone (e.g. *Saponaria Vaccaria*) have disappeared. Now (in September) a new railway is being laid down at each side of the two already existing on the ground. Thus the vegetation that was growing up beside the rails, much more plentifully than anywhere else on the cinders, has been, at least in the meantime, destroyed. The general surface of the cinders is very bare, except where soil has been mixed with them here and there, and where a few clumps of docks and other deep-rooted plants have gained a hold. On one part, where the surface looks almost covered with herbage from a little distance, there are several low-growing but vigorous plants of broom, and a few whin and gooseberry bushes.

On the area not covered with cinders the changes already described as in progress have continued to advance. The coarser grasses and weeds have still more fully occupied the surface, so that the former tracks have almost disappeared, and only one or two bare patches mark where sawdust heaps lay.

Over much of the ground it is now difficult to make one's way through the dense masses of thistles, hemlock, and other coarse weeds. Thus annuals and low-growing perennials become more and more restricted, and are now

confined to a few spots, chiefly near flour-mills along the south side of the ground, to the earthier patches on the cinders, and to rubbish thrown down along the edge of the cinders here and there.

The tendency to the diminution in number of species, and to the occupation of portions of the ground by individual species of the more vigorous large weeds, almost to the exclusion of all others, is still more marked than in 1896. A few species not previously observed have to be added; but these are hardly such species as might have been expected to occur. The absence of many of the commonest weeds of cultivation and of waste ground elsewhere near Aberdeen, formerly remarked on by me, is no less noteworthy this year than it was in past years. A few of the evidently introduced plants named in my former notes as increasing have in 1897 become very scarce, or even seem to have disappeared, while others have continued to hold their place unchecked or to increase, though not apparently more suited to do so.

My census this year was taken in July, and again in the beginning of September; and I use the same symbols to denote frequency and condition as before, viz. 1 *scarce*, 2 *not rare*, 3 *common*, 4 *plentiful* (each being modified by the signs — and + where desirable to denote a less or greater degree of frequency than that indicated by the number itself); *l.* denoting *local*, and *v.l.* *very local*. *Veg.* denotes the absence of flowers and fruits, and *fr.* denotes the presence of ripe or nearly ripe fruit. Species with neither symbol were in flower and fruit when recorded. The names of non-British species are in italics; and an asterisk before a name denotes that it is not native here, though British. I have noted each species observed in 1897, to contrast with my former lists, and have added brief notes of any points of special interest to many of the names.

Ranunculus acris, *L.*—1 in July.

R. repens, *L.*—0 to *L.* 3 + on the cinders and more open places, spreading much by runners.

**Papaver Rhoeas*, *L.*—One plant, in flower in July, on the cinders.

Hesperis matronalis, L.—Two plants, in flower, in July, and in flower and fruit in September. One seems to be the same plant as that observed last year.

Sisymbrium pannonicum, Jacq.—For this species, which in 1896 appeared to be increasing and seeded freely, I looked in vain in July. In September I found one plant just coming into flower on a rubbish heap on a part of the ground at some distance from where it had been most abundant.

Brassica Napus, L.—Abundant on a heap of rubbish on slope of cinders.

B. *Sinapistrum*, Boiss.—Fl. in September; common along the side near flour-mills.

Capsella Bursa-pastoris, Web.—Here and there on more open places, but diminishing.

[* *Lepidium Draba*, L.—The single plant recorded as brought from this ground into my garden in 1895 has spread freely by buds produced from the roots, which have extended widely through the soil. It produced numerous flowers, of which a considerable proportion, though not so large as in 1895, showed noteworthy deviations from the usual floral structure. The species has not reappeared on the waste ground under consideration.]

Cochlearia Armoracia, L. (horse radish).—I omitted to note the occurrence in 1896 of two plants in a vegetative state. These plants have grown larger this year, but have not shown any sign of flowering.

Viola tricolor, L.—One weak plant, on the cinders.

Lychnis alba, Mill.—Increasing in frequency, especially near the mills (up to 3 + there), but still only scattered singly over most parts of the ground.

Sagina procumbens, L.—Not observed till 1897, when one or two plants were found on the cinders.

Cerastium triviale, Link.—Up to 2 + on more open spots, but becoming less plentiful.

Stellaria media, Cyr.—Plentiful (up to 3 +) near the mills, but usually from 1 to 2, on opener spots becoming less plentiful.

Spergula arvensis, L., var. *sativa*, Boenn.—As in former years, more common (to 2) near mills.

Geranium molle, L. { Only one or two observed, becoming less
G. *dissectum*, L. { common as ground is covered with
coarser weeds.

Ulex europæus, L.—Eight or ten plants on the cinders, the largest being a bush about fifteen inches across. None have attempted to flower.

Cytisus scoparius, *Link.*—On the cinders at one place a good many plants were growing, the largest being nearly two feet across, but not tall. Several have been destroyed in widening the railway track.

Medicago sativa, *L.*, is holding its place ; but, though it flowers freely and produces a few fruits, it has not increased since last year.

**M. Falcata*, *L.*, is extending, though not rapidly, round the two places where it first appeared. The plants grow matted among grasses, but are very vigorous, flowering freely and setting a few fruits.

Trifolium pratense, *L.*—Only one or two plants observed.

T. hybridum, *L.*, and *T. repens*, *L.*—Diminishing in amount, owing to increase of coarser plants ; nowhere exceeding 2.

**Lotus tenuis*, *Wald.* and *Kit.*—One plant in flower was detected in September among grass. It had not been previously observed on this ground, and is only a rare casual in the district.

Vicia Cracca, *L.*, and *V. sepium*, *L.*, had both slightly increased, especially the former, which flowered.

Rubus idæus, *L.*, as before, except that one plant is now about three feet high.

Potentilla Anserina, *L.*, is very local. Not present over most of the ground, it forms one or two patches almost to the exclusion of other plants, and young plants occur here and there on the cinders.

P. recta, *L.*, was much less common, only one or two examples being observed on the cinders.

**Pyrus Malus*, *L.*—Most of the seedlings formerly noted are still growing, though slowly.

Ribes Grossularia, *L.*—This seems rather more numerous, especially on the cinders in one place ; some of the plants are now nearly a foot high. Several have been destroyed in making the new lines.

**R. nigrum*, *L.*—One or two observed, which had been overlooked in 1896.

**Lythrum Salicaria*, *L.*—The single plant formerly noticed was again in flower in 1897.

Epilobium montanum, *L.*—One small plant, in flower in July ; none observed in September.

Conium maculatum, *L.*—This is now one of the most conspicuous plants on the ground, covering large portions of it, either alone, or along with thistles and coarse grasses, so as to crush out the lower plants. It is increasing year by year, and its seedlings occupy the opener spots, often almost to the exclusion of annuals.

**Apium graveolens*, *L.* (celery).—The few plants originally observed still grow in a dwarfed condition, and flower; but they are not increasing.

Carum Petroselinum, *B. and H.* (parsley), has almost disappeared.

Ægopodium Podagraria, *L.*—Rather curiously, this weed, so common by roadsides and on waste ground, did not seem to have gained an entrance up to 1896. This year there is a good-sized patch of it on the south side, near the edge of the cinders, among and beside a heap of rubbish. It will doubtless increase rapidly. Despite its abundance as a weed, the distribution of this plant in N.E. Scotland points to its introduction, intentional or otherwise, by man.

**Scandix Pecten-Veneris*, *L.*—Several examples were found in flower in July, on the same rubbish as *Brassica Napus*. By September all trace of them had disappeared. This plant is scarce more than a casual, of very uncertain occurrence, near Aberdeen.

Anthriscus sylvestris, *Hoffm.*—One plant, in fruit. The rarity of this species on the ground is curious.

Caucalis latifolia, *L.*—Two examples, in flower and fruit, were found in July, near the flour-mills, probably grown from seeds thrown out among rubbish of wheat from South or East Europe. It has not occurred in this district before.

Galium Aparine, *L.*—One or two in July.

Bellis perennis, *L.*—A few on the opener places, but diminishing as these are restricted.

Achillea Millefolium, *L.*—Increasing slightly. Over most of the ground nowhere exceeding 2+, but forming compact masses of foliage in a few small patches.

A. Ptarmica, *L.*—This species was omitted by an oversight from my list; but it has been observed each year since 1893. Though very scarce when first noted, it has increased little by little, until in 1897 it has become not uncommon, especially on the south side of the ground.

**Anthemis arvensis*, *L.*—Abundant on rubbish with *Brassica Napus*. Not able to hold its place against the coarser weeds.

Chrysanthemum Leucanthemum, *L.*—Diminishing in frequency.

C. Parthenium, *Pers.*—Much less frequent, and tending to be crushed out.

Matricaria inodora, *L.*—Plentiful in some places, but becoming more restricted.

Artemisia vulgaris, *L.*—One or two plants, in flower and fruit.

Tussilago Farfara, *L.*, continues to spread, forming several large patches.

Senecio vulgaris, *L.*, occurs on cinders and on opener spots, but cannot contend successfully with the coarse vegetation.

Arctium minus, *Bernh.*—Not increasing.

Helianthus tuberosus, *L.*—One weak plant seen.

Cnicus lanceolatus, *Willd.*, is the most conspicuous plant on the ground, and continues to increase rapidly. In the autumn the seeds are scattered far and wide on every breeze.

C. arvensis, *Hoffm.*, is also increasing year by year, though not so abundant as *C. lanceolatus*; it forms some large clumps, and is freely mingled with the other coarser vegetation.

Centaurea nigra, *L.*, barely holds its place.

Lapsana communis, *L.*, appears to be increasing on the southern part, though slowly.

Crepis virens, *L.*, is becoming crushed out, and now occurs only isolated here and there.

Taraxacum officinale, *Web.*, scarcely seems to do more than keep its place on the more open spots.

Sonchus oleraceus, *L.*, is diminishing.

Lycopsis arvensis, *L.*—Of this a single example was found in flower in July. It had not been met with before on this ground.

Myosotis arvensis, *Lam.*, was more common here and there in July than it had been in former years.

**Volulus sepium*, *Junger*, has extended year by year, and has spread considerably since 1896, flowering with moderate freedom, and supporting itself on the coarse vegetation among which it climbs.

Convolvulus arvensis, *L.*, of which a plant was observed here for the first time last year, appears to have got a hold, two or three having been seen in 1897.

Solanum tuberosum, *L.* (potato).—A good many here and there, especially on rubbish.

Mimulus luteus, *L.*—One plant, in flower, on the cinders.

Mentha viridis, *L.*—Two patches in flower in September.

M. piperita, *L.* (not *M. viridis*) was destroyed under cinders in 1896.

Nepeta Glechoma, *Benth.*—Destroyed in the extension of the railways.

Scutellaria galericulata, *L.*—Two small patches, bearing flowers, were detected at the west end of the ground in July.

Galeopsis Tetrahit, *L.*—Common on a limited area near the flour-mills, along with other annual weeds.

Lamium purpureum, *L.*—Very scarce.

Plantago major, *L.*, and *P. lanceolata*, *L.*, are diminishing in frequency as the more open ground becomes more and more restricted.

Chenopodium album, *L.*, and *var. viride*, *Syme*, and *Atriplex patula*, *L.*, not quite so abundant as in former years.

Polygonum Convolvulus, *L.*, was common on rubbish along the edge of the cinders, and occurred in small numbers here and there on cinders; but some rubbish heaps that were densely covered with it in 1896 having been removed, it was much less abundant on the whole this year than last.

P. aviculare, *L.*, still common in the few open spots, but much less general than formerly.

P. Persicaria, *L.*—Much as in 1896.

P. lapathifolium, *L.*—Only one or two plants seen in 1897, diminishing in frequency.

Rumex.—The several species formerly enumerated by me showed scarcely any change in relative frequency in 1897.

Urtica dioica, *L.*—This nettle has spread little, but it forms two or three pretty large scattered clumps.

Carex ovalis, *Good.*—A single plant sprung up and fruited on the cinders, the only representative of the great order Cyperaceæ that has been found here.

Alopecurus geniculatus, *L.*—One or two small patches were observed.

Phleum pratense, *L.*, though by no means a common grass around Aberdeen, has from 1893 been frequent on this waste ground. It grows to a large size, and has continued to increase where undisturbed, so that it now forms a very conspicuous part of the coarse vegetation over much of the surface.

Agrostis palustris, *Huds.*, with *var. stolonifera*, and *A. vulgaris* *With.*—As in 1896.

Deschampsia cæspitosa, *Beauv.*—A few vigorous tufts are scattered over the area.

Holcus lanatus, *L.*—As in 1896.

Avena strigosa, *Schreb.*, **A. fatua*, *L.*, and *A. sativa*, *L.*—These occurred in small quantity on rubbish and on the more earthy patches on the cinders, chiefly in the neighbourhood of the mills

Arrhenatherum avenaceum, *Beauv.*, forms a part of the coarser vegetation as in former years, but does not seem to be increasing.

Dactylis glomerata, *L.*—The same remarks apply to this as to *Phleum pratense*.

Poa annua, *L.*, is diminishing as the open ground becomes lessened.

P. pratensis, *L.*, appeared slightly more common this year in July, perhaps because of the time of year.

P. trivialis, *L.*, did not seem quite so abundant as formerly.

P. nemoralis, *L.*—Two or three plants were observed in flower in July, and the hardly recognisable stems were again seen in September.

**Festuca rigida*, *Kunth.*—The name of this species was inadvertently omitted from my former list. It grew in 1893 and 1894 on the more open spots and paths, but the coarse vegetation has crushed it out.

F. elatior, *L.*, and *var. pratensis*, *Huds.*—As in 1896, not increasing.

Bromus mollis, *L.*, and *Lolium perenne*, *L.*, show no tendency to increase, nor can they hold their place against the larger grasses. Of *L. perenne*, *var. italicum*, *Braun*, only one or two plants were seen.

Agropyron repens, *Beauv.*, continues to increase, forming almost the whole of the vegetation in places. *Var. barbatum*, *Duval-Jouve*, is a good deal more abundant than *var. obtusum*, *Syme*.

Triticum vulgare, *Vill.*, *Secale cereale*, *L.*, *Hordeum distichum*, *L.*, and *H. hexastichum*, *L.*—Of all four a few plants were seen on rubbish, especially near the mills.

A comparison of the above list with my previous paper on the same flora shows very clearly the inability of all but a very few of the introduced plants to hold their place where left to contend with the native species. It shows too how a few vigorous and rank-growing species crush out many other less vigorous forms and impoverish the flora.

The following species that were included in the list for 1896 have not been observed in 1897. Several evident casuals among them, of which only one or two specimens were found, are denoted by an asterisk:—**Papaver dubium*, *Sisymbrium officinale*, *Brassica Rapa*, **Thlaspi arvense*, **Saponaria Vaccaria*, *Silene Cucubalus*, **Lychnis dioica*, *Vitis*

vinifera, *Medicago lupulina*, *Melilotus officinalis*, **Lotus uliginosus*, *Vicia angustifolia*, *var. Bobartii*, *Heracleum Sphondylium*, *Daucus Carota*, *Scabiosa arvensis*, *Anthemis Cotula*, *Chrysanthemum segetum*, *Matricaria Chamomilla*, *Senecio Jacobæa*, **Centaurea Cyanus*, *Cichorium Intybus*, *Hieracium boreale*, **Fraxinus excelsior*, *Echium vulgare*, **Veronica montana*, *Mentha piperita*, *M. arvensis*, **Prunella vulgaris*, **Phalaris canariensis*, *Festuca rubra*. To these might almost be added *Sisymbrium pannonicum*. Some of these, of which only a very few plants were seen in 1896, may have been overlooked in 1897 among the dense vegetation, but several, *eg.* *Melilotus*, are too conspicuous to be readily overlooked. A few have been destroyed by the operations of spreading the cinders and preparing part of the ground for new railway. The casuals, growing on rubbish, are of course destroyed when the rubbish is removed, so that their occurrence and disappearance signify little. A larger number of disappearances must be accounted for by the situations where the plants grew having been invaded and covered by hemlock, thistles, and coarse grasses.

The plants found in 1897, additional to those noted in 1896, are few, *viz.* :—

- (a) Casuals noticed for the first time, introduced with rubbish from the mills or railway ballast :—*Sagina procumbens*, *Caucalis latifolia*, *Lycopsis arvensis*, and *Carex ovalis*. Only one or two examples were found.
- (b) Not previously observed, but possibly there in 1896 :—*Lotus tenuis*, *Ægopodium Podagraria*, and *Poa nemoralis*.
- (c) Inadvertently omitted from former list :—*Cochlearia Armoracia* and *Achillea Ptarmica*. (See *Festuca rigida* also.)
- (d) Casuals observed in years earlier than 1896 :—*Papaver Rhœas* and *Brassica Napus*.

Very few of the introduced plants now survive, even of those which at first became more abundant and seemed likely for a time to secure a footing.

RECORDS OF SCOTTISH PLANTS FOR 1896,
ADDITIONAL TO WATSON'S "TOPO-
GRAPHICAL BOTANY," 2nd. Ed. (1883).

By ARTHUR BENNETT, F.L.S.

THESE carry on the annual records to the end of 1896 ; they are not numerous, as must be expected. The following contractions are again employed :—"Ann. S. N. H." denotes the "Annals of Scottish Natural History," *sp.* that a specimen was sent me, and ! that I have seen a specimen from the district.

74. WIGTOWN.

Atriplex littoralis (type), *sp.* } *M'Andrew.*
Potamogeton lucens.

75. AYRSHIRE.

(Records by *A. Somerville*, except one.)

Spergularia marginata. !
Potentilla suberecta, Zimm. = *Tormentilla* × *procumbens*, *sp.*
Rosa involuta, *Barclay* ("Ann. S. N. H.," p. 117, 1896).
Myriophyllum spicatum. !
† *Anthemis arvensis*. !
Avena pubescens. !
Koeleria cristata. !
Triticum junceum. !

85. FIFE AND KINROSS.

Potamogeton nitens, ! *Dr. Playfair*, 1873.

86. STIRLING.

(Records by *Col. Stirling* and *R. Kidston* in "Notes on Stirling Plants for 1896" (1897).)

† <i>Brassica alba</i> .	<i>Hieracium centripetale</i> , Hanb.
<i>Galium boreale</i> .	„ <i>pictorum</i> , Linton, var.
<i>Anthemis arvensis</i> .	<i>Mentha sativa</i> .

87. WEST PERTH.

Rosa involuta, *Barclay* ("Ann. S. N. H.," p. 117, 1896).

90. FORFAR.

Hypochaeris glabra. *Sp.* in Herb. Mus. Brit.; gathered by *Robert Brown* in August 1792. Confirms record for county.
Carex epigejos, Fries. (*non* Læstadius); *sp.* from *Dr. F. B. White*.

97. WESTERNNESS.

(Records by *S. M. Macvicar*.)

<i>Ranunculus sceleratus</i> , <i>sp.</i>	† <i>Scabiosa arvensis</i> , <i>sp.</i>
„ <i>bulbosus</i> , <i>sp.</i>	<i>Veronica Anagallis</i> , <i>sp.</i>
<i>Rubus Lindleianus</i> , Lees (teste <i>M. Rogers</i>).	<i>Listera ovata</i> , <i>ms.</i>
<i>Rubus corylifolius</i> , <i>ms.</i>	<i>Catabrosa aquatica</i> , <i>var. littoralis</i> !

(Records by *W. Grant*, ex *M. F. Miller*.)

<i>Arabis hirsuta</i> .	<i>Avena flavescens</i> .
<i>Cerastium semidecandrum</i> .	<i>Bromus asper</i> .
<i>Carlina vulgaris</i> .	<i>Poa nemoralis</i> .
<i>Lemna minor</i> .	

98. ARGYLE.

Moneses grandiflora, *E. S. Marshall* ("Journal of Botany," p. 400, 1896).

100. CLYDE ISLES.

Phragmites communis, *sp.*, *A. Somerville*.

102. SOUTH EBUDES.

(Records by *A. Somerville*.)

<i>Spergularia neglecta</i> , <i>sp.</i>	<i>Sparganium minimum</i> , <i>sp.</i>
<i>Potentilla procumbens</i> , <i>sp.</i>	<i>Juncus alpinus</i> , <i>sp.</i>
<i>Erythræa pulchella</i> , <i>f.</i> , <i>sp.</i>	<i>Deschampsia discolor</i> , <i>sp.</i>
<i>Polygonum Raii</i> , <i>sp.</i>	<i>Festuca rubra</i> , <i>sp.</i>
<i>Rumex conglomeratus</i> , <i>sp.</i>	<i>Hymenophyllum Tunbridgensis</i> !
<i>Potamogeton decipiens</i> , <i>sp.</i>	

103. MID EBUDES.

Rubus corylifolius (? recorded) proves to be *R. hirtifolius*, Muell. and Wirtg., probably the form given as *R. danicus*, Focke.
Epilobium parviflorum, *S. M. Macvicar*.

104. NORTH EBUDES.

Rubus thyrsiger, Bab. (teste *Moyle Rogers*), *S. M. Macvicar*.

105. WEST ROSS.

Subularia aquatica, *E. S. Salmon* (personal authority).

109. CAITHNESS.

(Records by *F. J. Hanbury*.)

Carex pelia, *O. F. Lang*, *sp.*

× *C. Grantii*, *Ar. Benn.* = *C. aquatilis* × *kattegatensis*, *sp.* (1887).

112. SHETLAND.

Holcus mollis ("required confirmation"). } *W. Beeby.*
Ophioglossum ambiguum.

ZOOLOGICAL NOTES.

Daubenton's Bat in Argyshire.—I am pleased to be able to add a new locality to the somewhat limited list of places this Bat is known to frequent in Scotland. Kinlochaline Castle is situated at the head of Loch Aline, an inlet from the Sound of Mull, in the district of Morvern, Argyshire. It is one of the best preserved old buildings in the Highlands, and, standing on a rocky eminence, it is an ideal place for the Bat and the Owl. For several years in the long summer nights I had often watched the Bats coming out from their retreat in the old castle to flit up and down the course of the river Aline or skim over the surface of the loch. The only species I had been able to identify up to this year were the Pipistrelle and the Long-eared Bat. On the 13th of June, while going through the castle, I noticed a crevice in the lintel of one of the windows which showed unmistakable evidence of the presence of Bats. There seemed no prospect of getting at them until I thought of trying the effect of smoke. Applying a match to a few scraps of paper which I pushed into the crevice, smoke soon began to issue from various cracks in the wall, and there was an immediate scramble among the Bats to get out. I soon caught as many as I wanted with my hands as they emerged from their retreat, and I then saw I had got something new to me. To ensure a correct identification, I forwarded half a dozen by post to Mr. William Evans, Edinburgh, and he pronounced them *Vespertilio daubentoni*. This Bat is not mentioned in Messrs. Harvie-Brown and Buckley's "Fauna of Argyll."—CHAS. CAMPBELL, Dalmeny Park.

On the supposed occurrence of the Harvest Mouse in Moray.

—In Messrs. Harvie-Brown and Buckley's "Vertebrate Fauna of the Moray Basin" (vol. i. p. 202), the Harvest Mouse (*Mus minutus*) is stated to occur in Banffshire. It is also stated that there is a specimen in the Banff Museum. I lately had the opportunity of examining all the Rodents there, and I can find no trace of a genuine Harvest Mouse. The only animal that might have been mistaken for it was a stuffed skin of a reddish-coloured Field Mouse (*Mus sylvaticus*), which might have been skinned from a spirit specimen. I do not yet believe that *Mus minutus* has ever been found north of the Grampians. Mr. Edward probably mistook young, bright-coloured Field Mice for Harvest Mice, as his knowledge of British Rodents was not complete. He said he "thought he had seen the Dormouse" in the North of Scotland. I think the Dormouse has never been found in Scotland at all. At any rate, if it had been once seen by a naturalist like Edward he would never have forgotten it.—WM. TAYLOR, Lhanbryde.

Sperm Whale in South Uist.—In the month of May last the carcass of a Sperm Whale (*Physeter macrocephalus*) in a comparatively fresh state was washed ashore on the west side of the island of South Uist. It was bought by Mr. Macaskill, Polcharra, who told me that it measured about 70 feet in length, and that he had got a large quantity of oil from it. I understand the skeleton is to be secured for the Glasgow Museum.—JOHN MACRURY, Barra.

The Pied Flycatcher in Dumfriesshire.—During this summer several Pied Flycatchers (*Muscicapa atricapilla*) have been under observation at a locality in Dunscore Parish. It was strongly suspected they were nesting, but the fact was not proven. The occurrence marks the latest extension of the species in Solway. It may be of interest to record the history of the Pied Flycatcher as a Dumfriesshire bird, so far as known to me. The late Mr. Hastings, bird-stuffer in Dumfries, saw a ♂ in Drumlanrig Park in the summer of 1865. My friend Mr. Tom Brown, Auchenhessnane, discovered a pair nesting at a spot on the Scaur Water in 1884. They reared a brood, and returned again to the same place in 1885. In August 1889 I met with a pair and their newly fledged young brood flitting about the gardens at Kirkwood House, near Lockerbie. About the same time, and for several years subsequently, Pied Flycatchers were seen in the vicinity of Thornhill by Mr. Robert Armstrong. On 30th May 1892 that gentleman took me to a pretty little glade on the Cample, where, in a hole in an alder-tree trunk, I had the pleasure of examining a nest containing seven eggs. There are what may be considered as two colonies: one in Annandale, the other in Upper Nithsdale. Small colonies they certainly are, but they bid fair to multiply and extend their bounds each recurring season.—ROBERT SERVICE, Maxwelltown, Dumfries.

Swifts in the Outer Hebrides.—I am just back from a ten days' sojourn in North Uist. You may like to hear that on Saturday, 28th August, I observed certainly one Swift (*C. apus*) on the west side. Three or four others were with it, which my companion, who has younger eyes than myself, pronounced to be exactly similar. Apparently they were fresh in from the sea; they were all flying low, more like swallows.—J. W. P. CAMPBELL ORDE, Kilmory.

[Several specimens are recorded in the "Fauna of the Outer Hebrides." Dr. MacRury, in his "Birds of Barra," says that one or two are seen each season.—EDS.]

Alpine Swift in Scotland.—The Muirkirk record of the occurrence of this species in the current number of the "Annals" reminds me of what is said in the "Trans. of the Gaelic Socy. of Inverness," vol. xii., 1885-86, in an article by Mr. Charles Fergusson on the "Gaelic Names of Birds," and the following extract may be worth printing in the "Annals":—"I know a very high precipice amongst the rocks of Strathardle, about 1400 ft. above sea-level, in which, in a crack or rent in the face of the cliff, the Alpine Swift has bred, and never missed a single season, from my earliest remembrance up till I left the district a few years ago, and I have no doubt they breed there still. My uncle has told me that, when he was a boy, over 50 years ago, they bred there then, and had been there from time immemorial. . . . I have lain for hours watching them, after the young ones had flown, in a flock of 12 or 16 flying about high in the air, and then all darting down suddenly into the crack in the rock, in which they held a chattering, screeching concert for a minute or so, and then all pouring out in a torrent quicker almost than the eye could follow them, screeching very loudly, and after a while circling about, repeating the performance again and again. I could not be mistaken about this being the Alpine Swift, as its white belly at once distinguishes it from the Common Swift. Old and young keep together in a flock till they leave the country early in August. I have never seen them anywhere else." Mr. Fergusson distinguishes their Gaelic names from that of the Common Swift, giving for the Alpine Swift—Gobhlan-monaiddh, Ainleog-monaiddh, and Gobhlan-nan-creag.—HUGH BOYD WATT, Glasgow.

[We are much obliged to Mr. Watt for calling our attention to the above. We have the gravest doubts, however, as to the correctness of Mr. Fergusson's identification of the species.—EDS.]

Bee-eater in Caithness.—A pair of Bee-eaters (*Merops apiaster*) were seen by Mr. Wm. MacPherson on the 12th of May last at Langwell; and one of them was seen two days afterwards attacking bees.—LEWIS DUNBAR, Thurso.

Cuckoo in Shetland.—On 11th June, Mr. Thomas Bowie and I came on a Cuckoo (*Cuculus canorus*) by the side of a stream in the North Delting Hills, Shetland. The bird was very wild, and would

not allow of our approach when we first came on it; later in the day, however, on our return, the bird was again in the same locality, and on this occasion it fell to my companion's gun. It had never cried during the period we observed it. The bird was a male, and its stomach was crammed with beetles and larvæ.—ROBERT GODFREY, Edinburgh.

Red-footed Falcon in Aberdeenshire.—A fine male specimen of the Red-footed Falcon (*Falco vespertinus*) was killed at Crimnagata on the 7th of May last. This is the third occurrence of the species in Scotland: the first having been killed at Hill of Fiddes, Aberdeenshire, 29th May 1866; the second at Hauxley, near the Borders, in October 1868. In the last edition of Yarrell's "British Birds" (vol. i. p. 70), it is stated that "two have been killed near Aberdeen." This is a mistake; there was but one, as above noted. It may be well, however, to say that when the Aberdeenshire one for 1866 was recorded in the local papers, and there appeared the following day a letter in which it was affirmed that one had been killed at Rothiemay, Banffshire, and three in Aberdeenshire, the last two having been killed and their nest and eggs taken, subsequent inquiry proved all these statements to be incorrect. The weight of the specimen now recorded was $6\frac{1}{4}$ ounces, expanse of wings $27\frac{1}{2}$ inches, length from beak to end of tail 12 inches, wings when closed same length as tail. Upper parts dark brown; primaries light mealy gray, with black shafts; tail black, with a greenish sheen when held to the light; abdomen and leg feathers cinnamon brown. The stomach was filled with shrew mice.—GEO. SIM, Aberdeen.

[There are two recorded Scottish specimens in the Edinburgh Museum: one killed at Kinghorn on the 20th September 1880; and the second near Jedburgh on the 21st June 1888.—EDS.]

Merlin nesting in Tree in Midlothian.—The extreme partiality of the Merlin (*Falco aesalon*) for a haunt it has formerly occupied—a fact well known to all field ornithologists—was strikingly illustrated in the case of a nest found this season in Midlothian. In 1896 a pair of Merlins chose an old crow's nest in an open wood-clump at the base of the Pentlands as the receptacle for their eggs; and on 30th April, when I first examined the nest, they had cleared out all the old pine-needles that accumulate in vacant nests, but had not as yet laid. On 9th May I again visited the wood and put the Merlin off the nest, and on climbing found two eggs. On 15th May the female was shot off her eggs, and the keeper forwarded a note to me stating the fact. The male lingered about the nest two days longer, and successfully eluded the repeated attacks made by the keeper on his life; he then forsook the locality, and I climbed on the 18th and took the four eggs. This year—in spite of the treatment accorded him last year—the male returned with another

mate, but did not proceed so early to nest. Its presence in the wood was not noted till the end of May or the beginning of June, but on this occasion both birds fell to the keeper's gun, and were brought to me on 10th June. The birds had chosen the same tree as that occupied by them in 1896.—ROBERT GODFREY, Edinburgh.

Honey Buzzards in Moray.—A pair, male and female, of Honey Buzzard (*Pernis apivorus*) was shot on the Findhorn on the 2nd of September last.—JAMES BROWN, Forres.

Pintail in the Forth District.—On the 1st of May last a pair of Pintail (*Dafila acuta*), male and female, was seen by Mr. Bruce Campbell and myself on Loch Leven. The late date on which the birds were seen is interesting, and is perhaps worthy of being placed on record.—T. G. LAIDLAW, Edinburgh.

Tufted Duck, Scaup, and Golden-eye in Orkney in Summer.—Although the Tufted Duck (*Fuligula cristata*) has already been recorded as occurring in the Orkneys in summer ("Annals," 1896, p. 21), yet it has been restricted to the larger lochs of Harray and Skaill—so far as I can judge, at least, from Mainland records available to me. On 26th May 1897, besides a party of Tufted Ducks on the Loch of Skaill, I saw single pairs on the mill dam of Stenness and on Clumly Loch, which are, however, close to those already known to be tenanted. In anticipation of some future records, I may say that I saw no Tufted Ducks on Tankerness in the east of the Mainland on 31st May.

I met with the Golden-eye (*Clangula glaucion*) twice on 26th May: a single bird on the Loch of Skaill, and a party of five on Clumly Loch—amongst which I could distinguish two adult drakes.

What pleased me most, however, among the ducks observed in Orkney was the presence of the Scaup (*Fuligula marila*) on the Loch of Tankerness, 31st May. I saw two pairs of this fine species, and I watched them for a long time, wondering, as I did so, when the first positive record—after the many recent appearances of the bird in summer—of its nesting with us would be made.—ROBERT GODFREY, Edinburgh.

Common Scoter breeding in the Inner Hebrides.—A pair of Common Scoters (*Edemia nigra*) had a nest in Tiree this season. I tried to find it, but failed. However, the young were hatched out and were daily seen by me in the little creeks along the shore. There were five young birds, and *both* old birds attended them—a very unusual thing in the duck tribe, I think.—PETER ANDERSON, Tiree.

The Brent Goose in the "Clyde" Area.—Scarcely anything has been published regarding the occurrence of the Brent Goose (*Bernicla brenta*) in the faunal area which drains into the Clyde and its frith. Gray in "The Birds of the West of Scotland"

makes no allusion to its occurrence in "Clyde." In the "Notes on the Birds of Glasgow and its Vicinity," by the same writer, in the "Notes on the Fauna and Flora of the West of Scotland" (Glasgow, 1876), it is stated that "the Brent Goose is very scarce," while the Barnacle Goose is declared to be "a regular winter visitant in large flocks to the grass banks of the estuary between Dumbarton and Helensburgh." In frequent excursions afloat and ashore in the locality named by Gray I have failed to get to close quarters with either species. However, Mr. David Gemmell, Mount Pleasant, Port-Glasgow, informs me that he has in his possession "Brent Geese shot on the Clyde opposite Port-Glasgow in the month of February—the month they are mostly seen. Bernicle are seen there too, but not so common. I have one shot there too." From the other side of the estuary Mr. W. A. Donnelly, Milton of Colquhoun, sends me interesting details of the movements of Brent Geese from the river in a N. by N.W. direction overland in spring; the first flight observed this year being on 7th February, numbering 70 birds, and a larger flight later in the same month consisting of 300 birds in three companies. The fly-line is invariably the one just mentioned, and the flights noted in previous years were in February, March, and once in April. In February 1895 Mr. Donnelly saw a flock of 57 Barnacle Geese flying due west. "In point of numbers, from my own observation," he says, "the Brent seem to outnumber the Barnacle." In the paper "On the Birds of Ayrshire and Wigtownshire," by Robert Gray and Thomas Anderson ("Proc. Nat. Hist. Soc. Glasgow," vol. i. p. 269), the Brent Goose is stated to be much less common than the Barnacle Goose "occurring, perhaps, in the proportion of one to fifty." No precise statement is made by the writers quoted of any occurrence of, or locality frequented by, either species. Mr. Charles Berry of Lendalfoot, South Ayrshire, informed me (*in lit.* 3rd March 1895) that the day after the great gale (21st-22nd December 1894) he shot a Brent Goose, and two days later he received for preservation a Barnacle Goose—"they are both rare here," he says. Information regarding a great haunt of Brent Geese at Fairlie, North Ayrshire, first reached me from my friend Mr. Hugh Boyd Watt, and I have frequently seen them there in numbers since their occurrence was reported to me. Thus in the present year I saw there on 1st January a flock of about 150, on 20th February I estimated the numbers at 600, and on 6th March about 250 in a flock, the birds apparently belonging to the white-breasted form. A Brent Goose was shot at Lamash during the winter of 1893-94, as I am informed by Dr. Neil Fullarton. Mr. Ben Jordan, Campbeltown, has informed me that Brent Geese and Barnacle Geese both occur in that locality, but I have no information regarding their relative numbers. It would be interesting to know upon what foundation the statements

in Gray regarding the great preponderance of Barnacle Geese and the scarcity of Brent Geese rest, as I can find no confirmation of them in "Clyde." I am certain that the term "Barnacle Goose" is often applied generically to the two species under consideration, and that statements regarding flocks of "Barnacle Geese" cannot safely be assumed to point in all cases to *Bernicla leucopsis*.—JOHN PATERSON, Glasgow.

Turtle Dove in Argyle.—On the 7th of September, at Drimnin in Morvern, I shot a Turtle Dove (*Turtur communis*)—a fact that may be worth recording in the "Annals," since the bird is certainly uncommon in the West of Scotland.—ARCHIBALD BURN-MURDOCH, Edinburgh.

Capercaillie in the Mid-Deveron District.—I have to apologise for sending you such a belated notice of what—so far as known—is the first instance of a Capercaillie being found in this district. On the 29th September of last year a young cock bird was shot by one of the keepers at a roe drive in the Binn Wood near Huntly. It was bagged as a blackcock, and acknowledged to be of unprecedented size. The bird was not in full plumage, and was probably hatched in that very extensive wood. At least one other was reported in course of the season.—DUNCAN M. ROSS, Glass.

Iceland Gull in the Outer Hebrides.—Mr. D. Mackenzie, of the Royal Hotel, Stornoway, sent an Iceland Gull (*Larus leucopterus*) to Messrs. Macleay, Inverness, for preservation. It was procured about the last days of August, which is an early date for that bird's appearance.—T. E. BUCKLEY, Inverness.

Buffon's Skua (*Stercorarius parasiticus*) in Moray.—One specimen was obtained at the mouth of the Findhorn river by John Garrow, Esq., on the 11th August 1897, as we are informed by Mr. James Brown.—J. A. HARVIE-BROWN.

Fulmar Petrels at Cape Wrath in the Breeding Season.—On the 19th of June last the s.s. "Pharos" left Loch Erriboll for Cape Wrath, where it was intended to land lighthouse stores. When close off the cliff which lies about half a mile to the eastward of the headland, which is a great breeding station of various species of rock-fowl, I was much surprised to see around the ship several Fulmar Petrels (*Fulmarus glacialis*) flying about in company with the numerous Guillemots, Razorbills, Puffins, Kittiwakes, etc. On the 30th of June the "Pharos" again called at Cape Wrath, and I again saw the Fulmar. If these birds had been observed *at sea* off the Cape, there would have, perhaps, been nothing remarkable in the circumstance; but their occurrence in the height of the season in the vicinity of a large breeding station of rock-birds, and their association with the birds actually nesting on the cliff, is significant, since it strongly suggests that the Fulmar has now a breeding

station on the mainland of Britain. We know that the species has recently much extended its nesting range in the Shetlands, to which along with St. Kilda, its range in the breeding season in our islands has hitherto been confined.—WM. EAGLE CLARKE.

Molva abyssorum in British waters.—Ten specimens of *Molva abyssorum* were caught by trawl twenty miles off Rona, 25th May 1897, and brought to Aberdeen Fishmarket. This is the second occurrence of this northern form within the British area; two having been caught 27th February 1895, thirty miles off Shetland, one of which came into my possession. So far as I am aware, this species has never been previously recorded as having been caught in British waters.

The fish differs from the common Ling in its lower jaw being longest, and the chin barbel being much shorter and thinner, the body being of a dusty gray colour above the lateral line and rather lighter along the abdomen, all the fins being nearly black and destitute of the white edging so conspicuous in the common form. It differs from the common Ling internally, in the abdominal cavity extending much farther behind the anal orifice; in the liver being broad and thin anteriorly, and extending posteriorly into a long sharp point, that of the common Ling being the same breadth throughout, and having two, sometimes three, short obtuse lobes at its posterior margin. Again, *abyssorum*, so far as I have seen, has only from 19 to 28 pyloric cœcæ, while the common Ling has from 20 to 40 such appendages; but this point cannot be spoken to definitely until a larger number of *abyssorum* has been examined. The teeth, both in form and arrangement, in both forms, are almost identical.

The stomach of one of the examples under notice was well filled with fish scales of great size, probably that of the Wrasse. As an article of food, *abyssorum* is excellent, its flesh being white, tender, and of pleasant flavour. Those examined were females, with the roe in its lowest stage of development.—GEO. SIM.

[Under the name of *Molua* [= *Molva*] *dypterygia* (Pennant), Lesser Ling, Professor Smit, in his "History of Scandinavian Fishes," pt. i. pp. 521-522 (1893), describes this fish as strictly a Norwegian species, living only in deep waters from 100 to 300 fathoms, and is common only north of Bergen and up to Finmark. Now and then, however, it enters the Skager Rack; where it has been taken in 35 fathoms of water. In the work quoted a fine coloured portrait of this new British fish is given, plate xxvi. fig. 3.—EDS.]

Liparis montagui (Donov.) in "Forth."—In August 1897 I captured half a dozen examples—two of which I handed to Mr. Eagle Clarke—of the little fish known as Montagu's Sucker, in rock pools at North Berwick. The largest was about $2\frac{1}{2}$ inches long. They were resting on, but not adhering to, the fronds of *Laminaria*

digitata. This species is not included in Parnell's "Fishes of the Firth of Forth," and I know of no subsequent record; but, from the fact of its occurrence at St. Andrews (in abundance), and also on the Berwickshire coast, it is probably not uncommon in the outer portion of the Forth.—WILLIAM EVANS, Edinburgh.

Pontocypris acupunctata, G. S. Brady, from the Clyde.—I have this Ostracod from two localities within the Clyde area, viz. off Port-Glasgow, where it was obtained in 1892, and in Campbeltown Loch, where it was dredged in April this year. *Pontocypris acupunctata* has been recorded from both the East and West Coasts of Scotland (though apparently not before from the Clyde), and as far north as Shetland. It appears nevertheless to be a scarce species, and its occurrence in the Clyde is therefore noteworthy.—THOMAS SCOTT, Leith.

Sabelliphilus Sarsi, Claparede, from the Firth of Forth.—In the last issue of the "Annals of Scottish Natural History" I reported the occurrence of this interesting Copepod in the Firth of Clyde, where it had been observed for the first time in Scotland. I have now to record its occurrence in the Firth of Forth, where it was found, as in the Clyde, adhering to the feathery plumes on the head of a large *Sabella*, and probably its distribution is coextensive with that of this Annelid.—THOMAS SCOTT, Leith.

Asterope norvegica, G. O. Sars, from near Montrose—New to Britain.—A single specimen of this rare Ostracod has been in my possession for several years, but has only lately been identified. The specimen was obtained near Montrose in September 1892, and I, failing at the time to recognise it, labelled it *Asterope, sp.*, and set it aside for further study. Attention to other matters, however, crowded out all remembrance of it till a short time ago, when my son, Mr. Andrew Scott, happening to notice it, identified it as above. There is no previous British record of *Asterope norvegica*, and the only other locality for which it is recorded is "Holmestrand in the Christiania Fjord, Norway, in 50-60 fathoms, muddy bottom," where it was discovered by Prof. G. O. Sars. I may state that Prof. G. S. Brady kindly examined the specimen and confirmed my son's identification of it. It was obtained off Montrose in about 14 fathoms water, where the bottom appears to consist largely of shelly sand.—THOMAS SCOTT, Leith.

Cytheropteron depressum, Brady and Norman, from the Clyde.—This somewhat rare Ostracod was dredged in Campbeltown Loch, Firth of Clyde, during April last. There does not appear to be any previous record of it from the Clyde district, and it is only within the past few years that it has been observed in the Scottish seas, and is probably not very common. It would seem, however, to have a fairly wide distribution even round the coasts of Scotland,

for I have specimens of this species both from the Firth of Forth and from the Moray Firth.—THOMAS SCOTT, Leith.

Xysticus erraticus (*Wlk.*), in **Inverness-shire**.—Since the publication of the list of Aviemore Spiders by Mr. Carpenter and myself in the "Annals" for 1894, I have detected among my specimens a female of this species obtained at Aviemore in June 1893. The identification has been confirmed by the Rev. O. P. Cambridge.—WILLIAM EVANS, Edinburgh.

Acherontia atropos—the **Death's-head Moth**—in **Solway**.—It is only seldom that a year passes without the occurrence of this grand species somewhere in our province. Mr. W. F. Kirby has expressed the opinion (Allen's Naturalist's Library—"Moths," vol. iv. p. 53) that it is much commoner in England than it used to be, and he appears to be justified in his remark. At the same time, I fully agree with Mr. Richard South when he comes to the conclusion ("Entomologist," vol. xix. p. 147) that "*Atropos* is rather a wanderer in, than a denizen of, the greater portion of Britain, and that the imagines and larvæ which occur outside those counties in which the species is more or less constant are either migrants or the offspring of migrants."

Extended migrations, comparable to those of the birds, do take place amongst the Lepidoptera; and what species amongst them is so pre-eminently adapted for such flights as *Atropos*? In the imago stage it has been found from the Shetlands to the Scilly Isles. I have a specimen that was captured on board a yacht which was sailing at the time betwixt Gibraltar and Malta. I know of one caught on a trawler midway between the Isle of Man and the Mull of Galloway. Both specimens were in very good condition. Yet for all its extended distribution in the British Islands, how seldom are larvæ found outside a few of the southern counties of England. Has the larva been found in Ireland? Mr. De Visnies Kane does not say that it has—indeed the contrary is inferred ("Catalogue of the Lepidoptera of Ireland," "Entomologist," vol. xxvi. p. 269). I am aware that the larvæ are, or were, "in plenty" at Formby, near Liverpool ("Naturalist," 1886, p. 50); but, as has been already stated, outside of a strictly southern limit, the occurrence of the larva is quite exceptional.

Last year, my friend Mr. Thomas Rae Bruce told me of the finding of a larva of *Atropos* at Cairnryan, Wigtownshire, on 24th August. Mr. Bruce's knowledge of natural history sufficiently authenticates the identity of the capture; and I have at present in safe keeping a larva of *Atropos*—a magnificent fellow, of the greenish type of coloration—and am assiduously watching its preparations for pupation. It was found in a potato field at Cluden, a few miles from Dumfries, and given to me by Mr. G. F. Scott-Elliot on the 4th September current. The rarity of the species in the caterpillar

state in Scotland (in fact I cannot ascertain that more than the two individuals noted in this communication have been hitherto recorded) is my excuse for writing at such length on the subject.—ROBERT SERVICE, Maxwelltown.

***Euchelia jacobæ* (L.) in Midlothian.**—Perhaps the fact that I caught a perfect specimen of the Cinnabar Moth on Blackford Hill, Edinburgh, on 24th June this year may be worth recording. Although a very common insect on the coasts of East Lothian and Fife, I do not remember having ever seen it so far inland before. Musselburgh is the only Midlothian locality given by Lowe and Logan in their list of the Lepidoptera of the county.—WILLIAM EVANS, Edinburgh.

***Tæniocampa gracilis* (Fb.) in Arran and Upper Forth.**—In my note on the occurrence of this moth at Oban in April 1894 ("Annals," 1896, p. 259) I omitted to mention that I had caught a fresh specimen at Brodick, Arran, on 30th April 1895. To these captures I can now add a third, namely, a rather worn example taken near Aberfoyle on 1st June 1897.—WILLIAM EVANS, Edinburgh.

BOTANICAL NOTES AND NEWS.

Notes on British Plants.—Under this heading Mr. Bennett continues in the "Journal of Botany" (July, pp. 259-264) remarks on the genus *Carex*. The following refer to Scottish examples:—

C. Goodenowii, Gay, var. γ *bulbosa*, Drej., gathered in 1896 by Mr. A. Somerville from sands near sea on Ayrshire coast.

C. flacca, Schreb., var. γ *acuminata*, Anders., from Outer Hebrides; *C. pelia*, O. F. Lang, from Caithness, in July 1887, J. Hanbury.

C. panicea, var. *tumidula*, Laest., from Glen Carron, W. Ross, gathered by Mr. Sewell; *C. vaginata*, Tausch., β *sparsiflora*, Hartm., in several places in Scotland; *C. panicea*, L., b. *intermedia* (Mieg.), near Fort William, by Rev. E. S. Marshall; *C. capillaris*, L., var. *major*, gathered in Glen Shee by Mr. Ewing, and recorded by him ("Glasg. N. H. Soc.," 1888, p. 110) as var. *alpestris*, Anders.

C. vesicaria \times *rostrata* (\times *Pannewitziana*, Figert), found in Perthshire by Dr. F. B. White.

Varieties of Plantago Coronopus.—In the "Journal of Botany" (July, pp. 257-259, pl. 371), a variety new to Britain (*ceratophyllon*, Rapin) is described and figured from Dorsetshire, and seven other varieties of the type are described briefly. Of these forms, besides the type, the following have been recorded from Scotland:—*pygmæa*, Lange, found by Mr. Beeby in Yell in Shetland, and *maritima*, Gren. and Godr., collected in Tiree in

1896 by Mr. S. M. Macvicar. The other five varieties have not yet been recorded from Britain, all being found in S. Europe, N. Africa, Canary Islands, or W. Asia. The various forms are distinguished thus :—

1. *Coronopus*, L. ; root generally slender, annual or biennial ; leaves spreading flat on ground, rarely suberect, linear or lingulate, 1-nerved, usually with narrow acuminate ascending lobes ; scape usually exceeding leaves, rachis of scape about $\frac{1}{4}$ to 1 inch or more long ; bracts acuminate, longer than sepals ; capsule 3-4-locular, 3-4-seeded (" Eng. Bot.," pl. MDLX.)

2. *Ceratophyllum*, Rapin ; root long, thick, probably perennial ; leaves 6 inches long or more, suberect, hairy, oblanceolate, 3-5-nerved, rachis of leaf broader, acute or acuminate, with remote, occasionally toothed acute or subacuminate lobes ; scape rather more hairy than in type, rachis of scape 1 to 4 inches long ; bracts acuminate, longer than sepals ; capsule 3-locular, usually 2-seeded.

3. *Pygmaea*, Lange, dwarf ; leaves narrow, $\frac{1}{2}$ - $\frac{3}{4}$ inch long, with narrow segments ; scapes generally ascending, just longer than leaves, spikes globose, 2-4-(or more)-flowered.

4. *Crithmifolia*, Wilk. and Lange ; leaves not carnosely, bipinnatifid, hirsute, rachis of leaf dilated towards apex, sub-3-nerved, lobes oval, lanceolate ; scapes ascending. S. Spain.

5. *Latifolia*, DC. ; leaves not carnosely, hirsute, lanceolate or linear-lanceolate, rachis broad, 3-nerved, lobes linear-lanceolate ; scapes ascending. S.W. Europe and N. Africa.

6. *Maritima*, Gren. and Godr. ; leaves carnosely, smooth or ciliate, linear-lanceolate, pinnatifid, rachis of leaf broad, 3-nerved, lobes linear ; scapes erect. France, S. Spain, Berlengas off Portugal, Tiree.

7. *Integrata*, Gren. and Godr. ; leaves carnosely, linear, acuminate, subentire, scarcely dentate, ciliate or smooth, rachis of leaf sub-3-nerved ; scapes slender, erect. Sweden, France, Spain, Canaries, Mediterranean, S. Persia.

8. *Cupani*, Denk. ; leaves rosulate, with narrow rachis and lobes ; spikes oblong ; bracts ovate, rotund, acute, shorter than calyx. Mountain pastures in Sicily and Morocco.

9. *Bipinnatifida*, Wirtgen ; leaves pinnatifid, with narrow rachis and lobes. Rhineland.

Eriocaulon in Coll.—In the "Annals" for 1896, p. 249, I gave some reasons for thinking that Macculloch, in his "Highlands and Western Isles of Scotland," 1824, had made a mistake in giving *Eriocaulon* as occurring in the island of Coll. On visiting the island again this year, however, I was pleased to find that the plant does occur there. I found it growing in a loch named Loch a' Mhill' Aird, in the north end of the island. At the shallow margin of this loch *Ranunculus petiolaris*, Marshall, is to be seen, but not in any quantity.—SYMERS M. MACVICAR.

Juncus tenuis, *Willd.*, in **Moldart**.—I found one plant of this rush last August in the centre of a disused road in this district. This is probably its first year of flowering, as I could hardly otherwise have failed to have noticed it before. There were seventy-seven flowering stems in the tuft. As American hay has frequently been brought into the district of late years, it strengthens the suggestion that the *Juncus* has been introduced into Britain by this means. This locality for the plant has no connection with that of Arisaig previously recorded; as, although they are but twenty miles apart, there is only a bridle path between the districts, which are also supplied from different centres.—SYMERS M. MACVICAR.

Myurium Hebridarum, *Schp.*, in **Tiree**.—I found this rare moss last July in a few places on Scarinish Moor in this island. It is easily recognised at sight by its dense golden tufts of some inches in breadth. It has been previously found on some of the islands of the Outer Hebrides, and at Loch Coruisk in Skye; but nowhere else in Britain, I believe. It is not known to occur in any other part of Europe, but has been found in the Canaries.—SYMERS M. MACVICAR.

Peziza ammophila, *D. and M.*, in **East Lothian**.—On the 17th of August 1896 I found a single plant of this local fungus growing on the sandhills at the far end of Luffness Links in East Lothian. So far as I know, this is the first record for "Forth." As a Scottish plant, *P. ammophila* was first detected about twenty years ago at St. Andrews, where I found it still in plenty in 1890. The "Annals" for 1893 contains an interesting article on the species by Professor Trail, who, I may add, has seen the Luffness specimen.—WILLIAM EVANS, Edinburgh.

Carex from Ben Lawers.—I have gathered a Sedge on Ben Lawers that is either *Carex helvola* or *C. macilentæ*.—G. C. DRUCE.

CURRENT LITERATURE.

The Titles and Purport of Papers and Notes relating to Scottish Natural History which have appeared during the Quarter—July-September 1897.

[The Editors desire assistance to enable them to make this Section as complete as possible. Contributions on the lines indicated will be most acceptable and will bear the initials of the Contributor. The Editors will have access to the sources of information undermentioned.]

ZOOLOGY.

DAUBENTON'S BAT IN ARGYLESIRE. Charles Campbell. *The Field*, 31st July 1897, p. 222.—A short account given of a colony found last June in Kinlochaline Castle.

A LIST OF BIRDS OBSERVED IN SHETLAND, MAY AND JUNE 1897. By Bernard A. E. Buttress. *Zoologist* (4), vol. i. pp. 360-362 (August 1897).—A list of sixty-three species is given; of these the eggs were found of twenty-seven.

NOTES ON A "LIST OF THE BIRDS WHICH HAVE BEEN OBSERVED IN THE DISTRICT OF ARDNAMURCHAN, ARGYLSHIRE," WITH ADDITIONS THERETO. By John J. Dalgleish, F.S.A. Scot., M.B.O.U. *Trans. Nat. Hist. Soc. Glasgow* (N.S.), iv. pt. iii. pp. 347-350 (March 1887).—Adds sixteen species to the list, making the total number of birds of the peninsula one hundred and thirty-one.

APPEARANCE OF MIGRANTS IN ABERDEENSHIRE DURING 1896 AND 1897. William Wilson. *Zoologist* (4), vol. i. p. 366 (August 1897).

BEE-EATER IN CAITHNESS. J. H. T. *The Field*, 28th August 1897, p. 389.—A pair seen and the male shot at Langwell on 12th May.

BLACK-THROATED DIVER BREEDING IN SHETLAND. Bernard A. E. Buttress. *Zoologist* (4), vol. i. p. 364 (August 1897).

SUMMER APPEARANCE OF WILD GEESE IN FIFESHIRE. A. H. Meiklejohn. *Zoologist* (4), vol. i. p. 363 (August 1897).—On 1st July a flock of about twenty flew over the links at St. Andrews in an easterly direction.

NOTES ON THE ANIMAL PLANKTON FROM H.M.S. "RESEARCH." By Thomas Scott, F.L.S. *15th Ann. Rep. Fishery Board Scot.*, pt. iii. pp. 305-315 (1897).—Records the results of the examination of twenty-four tow-net gatherings collected in July and August 1896 in the Shetland-Faroe Channel. Notes are given on some of the species.

LUMP SUCKERS IN SALMON NETS. Gerald Ansdell. *The Field*, 21st August 1897, p. 318.—A number of specimens of *Cyclopterus lumpus* caught at Kilmelford, Argyle.

THE MARINE FISHES AND INVERTEBRATES OF LOCH FYNE. By Thomas Scott, F.L.S. *15th Ann. Rep. Fishery Board Scot.*, pt. iii. pp. 107-174, pls. i.-iii. (1897).—In this catalogue the total number of species enrolled is 837, which includes several not before recorded for the Clyde, one Copepod new to Britain, and one new to science.

NOTES FROM THE GATTY MARINE LABORATORY, ST. ANDREWS—No. XVIII. By Prof. M'Intosh, M.D., LL.D., F.R.S. *Ann. and Mag. Nat. Hist.* (6), vol. xx. pp. 167-178.—Include a description of a new species of *Evarne* from Rockall (p. 168).

THE INVERTEBRATE FAUNA OF THE INLAND WATERS OF SCOTLAND—Part VII. By Thomas Scott, F.L.S. Including AN ACCOUNT OF THE EXAMINATION OF SOME OF THE LOCHS OF SHETLAND. By Thomas Scott, F.L.S., and Robert Duthie. 15th Ann. Rep. Fishery Board Scot., pt. iii. pp. 316-333, pl. ix. (1897).—The species recorded include a *Canthocamptus* new to science, a species of *Moraria* new to Britain, and a species of *Cyclops* new to Britain. A species of *Cyclops* new to the Scottish fauna is also recorded.

ADDITIONS TO "BRITISH CONCHOLOGY." By J. T. Marshall. *Journ. of Conchology*, vol. viii. pp. 353-372 (April 1897), and pp. 385-395 (July 1897).—A large number of Scottish records are given.

LIST OF ADDITIONS, ETC., TO SHARP AND FOWLER'S "CATALOGUE OF BRITISH COLEOPTERA" (1893). By G. C. Champion, F.Z.S. *Ent. Mo. Mag.* (2), vol. viii. pp. 145-147 (July 1897).—The following Scottish records are mentioned:—*Bembidium virens* (Loch Maree) and *Telephorus figuratus*, *var. cruachanus* (Ben Cruachan).

NESTING OF THE GREAT NORTHERN AND BLACK-THROATED DIVERS IN SHETLAND. O. V. Aplin. *Zoologist* (4), vol. i. p. 425 (September 1897).—This note discusses two statements respecting these birds in an article by Mr. Bernard A. E. Buttress in the previous number of the magazine.

GOLDEN EAGLE IN ROSS-SHIRE. John Morley. *Zoologist* (4), vol. i. p. 425 (September 1897).—A fine specimen, two years old, and measuring 36 in. in length, and over 7 ft. in expanse of wings, and weighing 11 lb., caught a few days previous to publication.

BOTANY.

EXTRACTS FROM BOTANICAL EXCHANGE CLUB REPORT, 1895. By William H. Beeby, F.L.S. *Journ. Bot.*, Aug., pp. 307-312.—*Caltha palustris*, L., *var. procumbens*, Beck, "Marshy ground, Loch Insh, near Aviemore, v.c. 96, 15th June 1894; A. Somerville," is referred to *C. radicans*. *Weingertneria canescens*, Bernh., sand-dunes by the sea between Morar river and Arisaig, July 1895; Frederick Townsend. Mr. Townsend ascertained that it had been sown here by Mr. E. A. Macdonnell of Morar.

NOTES ON WEST ROSS PLANTS. By E. S. and C. Salmon. *Journ. Bot.*, Sept., pp. 347-349.—Is supplemental to Mr. Druce's "Flora" in *Trans. Bot. Soc. Edinb.*, 1894. New records for v.c. are *Rubus Rogersii*, Linton, and *R. villicaulis*, Kochl., from Kinlochewe; *Epilobium anagallidifolium*, Lam. \times *palustre*, L., Slioch; *Circœa alpina*, L., *var. intermedia*, Loch Maree; *Hieracium graniticolum*,

W. R. Linton, *H. atratum*, Fr., f., *H. senescens*, Backh., *H. Leyi*, F. J. Hanb., all from Slioch; *H. Schmidtii*, Tausch., and *H. rubicundum*, F. J. Hanb., var. *Boswelli*, Linton, both near Kinlochewe; *H. argenteum*, Ben Eay; *H. Sommerfeltii*, Lindeb., Slioch; *Euphrasia brevipila*, Burn. and Gremli, Kinlochewe; *E. scotica*, Wettst., Ben Eay; *Poa Balfourii*, Slioch.

MONOGRAPH OF THE BRITISH SPECIES OF EUPHRASIA, PREFACED BY AN EPITOME OF PROF. WETTSTEIN'S VIEWS ON THE DEVELOPMENT AND DISTRIBUTION OF THE BRITISH SPECIES. By Frederick Townsend, M.A., F.L.S. *Journ. Bot.*, Sept., pp. 321-336. —Only the "Epitome" is included in this instalment.

PLANTAGO CORONOPUS, VAR. CERATOPHYLLON. By E. G. Baker, F.L.S. *Journ. Bot.*, July, pp. 257-259. —See p. 259.

SALIX HYBRIDS. By Rev. Ed. S. Marshall. *Journ. Bot.*, Aug., p. 313. —*S. Lapponum* \times *repens*, reported from Lochsie Burn, in cultivation proves to be true *S. Lapponum*. Supposed *S. Arbuscula* \times *herbacea* from Ben Chaisteil, Argyle, is only *S. Arbuscula* with unusually rounded leaves. A willow from the same hill proves to be *S. Arbuscula* \times *nigricans*.

SALIX CERNUA, LINTON. By E. F. Linton. *Journ. Bot.*, Sept., p. 362. —Recorded as in fair quantity on Little Craigindal, Braemar.

NOTES ON BRITISH PLANTS (*Carex*). By Ar. Bennett, F.L.S. *Journ. Bot.*, July, pp. 259-264. —See p. 258.

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